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Duquesne University:

LITTLE LESSONS IN LOGIC

By

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Preface

IN placing this little pamphlet in the hands of the students of the philosophy department of Duquesne University, the author wishes to make his position clear.

The book is not intended to be "just another philosophy text" for the general public; it has been printed for private circulation, and for the use of his own pupils exclusively. Commendations are unsolicited; criticisms of it, as a "work", or "book" or "text" miss their elusive object, as it contains mere informal *talks on logic.* Hence, sometimes the reader will find a verb in the first person singular side by side with a second person plural, and other grievous, glaring errors in grammar, diction, and style. There is throughout an intense effort at making the *class* understand. There is no attempt at originality or pedantry; there are no voluminous foot-notes; no copious indeces, no pretentious bibliographies. For the most part, almost entirely, it is the result of the work of a painstaking pupil, who simply wrote what she heard and saw. With these explanations, I dedicate this effort, and give it to my pupils.

J. F. C.

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General Introduction

PHILOSOPHY

The word "philosophy" is derived from the Greek (*Philo*). "I love," and (*Sophia*), "wisdom." A philosopher, therefore, is "a lover of wisdom."

IN the beginning the word had no fixed meaning: now a poet, now an artist was a "sophos"; in general, whoever was skilled in any art. But Pythagoras (500 B. C.), seeing that God alone was wise, did not dare to call himself a "sophos," wise man, but only a lover of wisdom. Being asked what art he knew best, he replied that he knew no art but was a *philosopher*. St. Augustine tells us that ever afterwards it was used in reference to persons who excelled in any art pertaining to wisdom. Gradually the name became restricted to a more scientific signification; for Socrates, it was the internal knowledge (know thyself); for Aristotle and Plato, it was a scientific knowledge of God, man, the world, being good. The Epicureans restricted it again to the inquiry into human happiness; the Stoics, to the zeal for virtue or passivity of emotional life; the Neoplatonists, to the complexity of all human knowledge.

Passing over some false notions: De Bonald, Descartes, Malebranche, Reid, the Materialists, German Transcendentalists, the celebrated definition of philosophy given by Cicero in his *De Officiis,* is worthy of note: The science of human and divine affairs and of the causes in which these are contained. Finally, the Scholastic definition is but an explanation and determination of Cicero's. Hence it is as follows:—

PHILOSOPHY is the science of all things by their last causes, had by the natural light of reason.

PHILOSOPHY IS A SCIENCE. What is a science? Science is knowledge—classified knowledge—knowledge that is obtained by demonstration. Science, in the first place, is knowledge based on certain principles. For instance, the man who knows what kind of weather we are going to have, has a certain kind of knowledge; but you can hardly call it scientific knowledge. By *science* we mean a knowledge of things in connection with their causes. Scientific knowledge is that knowledge which is had by demonstration. Your conclusion must be a knowledge beyond doubt—it must be certain. Philosophy is, therefore, a scientific knowledge *of all things.* The astronomer gazes at the stars, while the botanist is interested in the formation of plants, etc.; but the philosopher judges of all things. Every entity that has a possible or real existence falls under his observation. All the other sciences that we know or don't know fall under the object of philosophy. This study stops at nothing. It does not treat of any one thing in particular, but of all things in general; anything that can be properly called an entity is an object of philosophy. The philosopher is the specialist of all specialists. In this way, philosophy is distinct from all the other sciences.

PHILOSOPHY TREATS OF ALL THINGS. How? *By their last causes.* What is a cause? A cause is that which, in any way, influences production; there is always a resultant, and that which produces this result, is called its cause.

There are *four causes* for everything:

1. The formal cause—What is it?
2. The material cause—From what?
3. The efficient cause—Who or by what means?
4. The final cause—Why or for whom?

No matter what you think of, this thought must be about something. When you treat a subject thoroughly according to its four causes, nothing more can be said about it. In philosophy, we want to find out the *reason why* as a final point. The last or highest cause means giving the reason or cause beyond which there can be no further investigation.

HAD BY THE NATURAL LIGHT OF REASON—Just as we have electric light, gas light, and natural daylight, so for the intellect, we can know a thing by reasoning it out, by having been told so by God, or by peering into the unknown future. By prophetic light, one is enabled to see into the future; this light was possessed by the prophets of old; by the light of faith, we are enabled to understand our religion. That which we get by the light of reason is called philosophy. A person who intends to take up this subject must make up his mind to work, to use his own intelligence, and not somebody else's. Not that God will not give to those who ask, but we must not expect extraordinary things. The person who expects to become learned by inspiration makes a big mistake. This gift was vouchsafed to some of the saints; many of them have been able to explain difficult passages of Holy Scripture, etc., without having studied; but this is not God's ordinary way of dealing with man. What we get we must work for. The more we know by means of our reason, the more will we love God, since knowledge rightly directed leads to Divine Truth Itself. When a person is morally well disposed, the more he knows of God in this life, the better he will know God in heaven.

NOTION OF SCIENCE IN GENERAL—The name "scientia" may be taken in three different ways:

1. The widest and most general meaning of "Science" is what we call *any* knowledge, whether it be by demonstration or simply a question of proof-hypothesis. In that sense, any proof or argumentation, whether based on premises that are certain and evident, whether based on probable premises or on hypotheses, is called a science.

2. The more direct sense is of knowledge, actual or hypothetical; inductive or deductive; the latter two must be certain.

3. In the strictest sense, science is the knowledge of a thing by its causes. It makes no real difference what cause is invoked—material, formal, efficient, or final, so long as it is knowledge by cause. Of all the causes, the *formal cause* is the important one—that which makes a thing be what it is.

Knowledge by cause is science. If we consider an entire field of thought; for instance, natural theology—all about God, His existence, His action, His essence, we can apply the word *science* to that system.

I. Science, as applied to an entire system and not to any *one* thesis, is a complexity of different conclusions which are deduced from principles that are certain, about a certain determined object, and which are logically connected or joined together.

This is the difference, as applied to a system, and a demonstration of one particular proof—*there must be many conclusions.*

Deduced from certain principles, principles meaning the foundation upon which the science is based. Every science must have certain rules, axioms, etc., upon which that science is built.

About a certain determined object—there must be a unity about one definite object—conclusions about one determined object. The oneness of the object makes the unity. Everything in theology has one consideration—God, from God, relating to God. God is the central point toward which all else is directed. The unity of the object makes the unity of the science.

Conclusions must be logically connected or joined. No better example of this can be found than in the doctrine of St. Thomas, in the first part of his Summa. In proving the existence of a First Mover, he proves also that God's nature is existence; from which he proves that God is all-perfect, because His existence is the perfection of all perfections; from that he proves that God is one, simple, immutable, omnipotent, etc. The same holds true in all the sciences.

To sum up the *definition of Science,* there must be unity, principles, logical connection, and conclusion. These constitute its four conditions.

II. *OBJECT OF SCIENCE*—In this regard, we must consider:

1. What is the object of science in general.
2. What are the various objects of science specifically.

The object of science in general is that which is proposed or thrown in the way of the investigator—that which is presented for our consideration. The subject is taken from the point of view of the intellect acting on it, while the object is that complexity of things which are placed before the mind of the investigator.

The object of science is twofold: Material and Formal. The Formal Object may be subdivided into the Formal Object "Quod" and the Formal Object "Quo."

The *Material Object* of any science is not necessarily something corporeal, but that which is treated of; for instance, in geography, the material object is the earth; in astrology, the stars. The material object is the matter about which the science treats. Geology treats of the earth—the material object is the earth. Consequently, even in a matter like psychology where the soul is not a material substance, nevertheless, there is the material object of that science.

The thing subjected to the consideration of the mind is the material object. Let us apply this to philosophy:—

The material object of philosophy includes everything under the sun —not each individual thing, but everything in general. Wherever and whenever a subject comes up, the philosopher studies it.

How does the philosopher examine things? For instance, take the object rain. What is it? Something that comes from the clouds. This is true, but I want to find out just *where* the rain comes from—how the clouds got it—on to the last analysis possible.

Another example: This is a nut. Where did it come from? You will say a tree, but the philosopher is not satisfied with such an answer. He wants to know where the tree came from. You would answer, from an acorn. Where did the acorn come from? etc.

Take chemistry, for instance. It will begin with an atom. It does not examine the atom as to its nature, but the philosopher wants to know the why and wherefore of the whole matter—its cause and effect.

To sum up, the material object is that with which the science is concerned.

FORMAL OBJECT—The formal object of a science is the point of view of the person—the position in which he puts himself to consider the material object. The formal object is that by which the material object is known. For instance, in theology, God is the material object. Now, we have theology and theology. We have a theology which we get from faith, and a theology which we get from natural reason; we have sacred theology and natural theology. God is the object of both; the difference is in the view point taken, the way in which we look at the material object. In sacred theology, we take faith as our view point; in natural theology, our reason. This formal object is what is also called the Formal Object "Quod."

THE FORMAL OBJECT "QUOD" is that particular aspect of the material object which is taken by the subject; it is the particular point of view we take in looking at the material object.

The formal object "Quod" is that point of view on account of which all things are treated in that science, and without which that science would not exist—the reason on account of which we treat everything in a particular science. The science of philosophy treats of all things by reason, but treating of them by their last causes, makes the formal object "Quod" —that particular point of view that we take of a material object, which constitutes the science, and without which the science could not be.

In any science, it is the reason on account of which everything in that particular science is considered, and without which there is no science. It is that particular point of view in which we place ourselves to consider everything contained in the science. Therefore, in order that any science be a *particular science* and not any other science; in order that there be a specification of sciences; in order to tell one from the other and at the same time define that science, we have the formal object "Quod." If this is the notion of the formal object of anything, then the specification of the science must come from it.

THE FORMAL OBJECT "QUO" is the means the subject uses to look at the formal object "Quod." The reason is the formal object "Quo" in all divisions of philosophy. If we want to find the formal object "Quo," the means by which we get this object is the light of reason.

ADEQUATE OBJECT—That which results from the material and formal "Quo" and "Quod" objects, is known as the adequate object.

III. *SPECIFICATION*—The specific principle is that which differentiates the sciences. We have the science of chemistry, the science of physiology, etc. What makes them different? We will first state the question, and then give the solution of the difficulty.

1. What is that principle by which any science is that particular science, and no other? What is it that make it one in itself, and distinguishes it at the same time from the other sciences? What is its *forma?* It is the forma or form that gives unity. For instance, the soul in a living thing makes that thing one. The fact that a piece of marble is carved into a statue makes it no longer subject to any other form: it is now a statue. It is form that gives unity to a science. What is that principle that gives a science oneness? What is it that gives each science its special characteristic? For the sake of clearness, we may divide the solution into two statements: the first is that the *specification of any science* necessarily depends on its object; and secondly, the specification of any science depends not on the material object, but on the formal object "Quod." For instance, we have the science of psychology. The formal object "Quo"—the means by which we arrive at these conclusions—is the same for all—our reason. All philosophy treats of entity—being—so the division or distinction of the various parts of philosophy is not taken from the material object, but from the formal object "Quod."

The species of anything is the same thing as its form. It is the form that gives unity. What, then, is the specification? It comes, not from the material object, but from the formal object "Quod."

Science means a certain number of conclusions about a certain object. In this first conclusion, there is little or no difficulty. If there were no numbers, you could not have the mathematical sciences. It is the object in general that gives being to the sciences. It is because the object is there that human minds go to find what they can about it.

The second conclusion is more difficult. The specification of a science depends not on the material object, but on the formal object "Quod." In general, matter or material is the principle of multiplicity. Matter is never a unifying element. If, for instance, we are human individuals, what makes each individual be himself, and not another? This is the *principle of individuation.* In the last analysis, the individuating notes—form, shape, position, place where, time when, name, lineage. These notes are the ramifications of matter.

Matter is the principle of multiplicity, and the material object in a science cannot give unity to that science. Matter being essentially the principle of multiplicity, it tends rather to divide than to unify a science.

The *specification of a science* is the same thing as the principle on which it depends—it is the unity of the science. What is it that gives unity? Matter can never give unity to a science. Therefore, specification *cannot come* from the material object. Take, for instance, the material object of physiology, psychology, astrology, and astronomy; take the material object of all philosophy in general; it is entity. Each individual object; for instance, the stars—each star has an individual difference from every other star. That which is the principle of multiplicity in any star, cannot be the principle of unity—that which unifies the science.

IV. *KINDS OF SCIENCE*—They are: Theoretical, Speculative, Practical, Rational, Experimental, Physical, Mathematical, and Metaphysical.

Speculative Science—This science is the study of an object for the sake of truth.

Practical Science always has in view something in reference to our own lives; it has to do with our own human actions.

Rational Science is that science which is investigated by the light of reason. It is experimental from the things around us.

Mathematical Science gives us a notion of quantity.

Physical Science abstracts from the matter in general.

Metaphysical Science is the highest of all sciences. It considers entity in an immaterial way.

Since matter is a principle of multiplicity, the principle of potentiality, and also the principle of imperfection, the more material a thing is, the more imperfect. The lower the grade of life, the greater the increase in matter and the more imperfect is life. *Metaphysical Science*, the *highest of all sciences, abstracts* from all consideration of matter. It is a science of real entity immaterially considered.

V. THE EXCELLENCE, UTILITY, AND NECESSITY OF PHILOSOPHY.

Philosophy considers the noblest and highest subject in the natural order, that which is, as it were, the heaven of every thing. By it, man rests content in the sweet contemplation of supernatural beauty. Moreover, it exercises a two-fold excellence over every other branch of study: the principality of direction and of correction. It directs by its principles, and by the very fact that any science deflects from the dictates of sound philosophy, it is unsound. Hence, philosophy is a corrective form for all other sciences.

Again, philosophy perfects the higher, nobler elements in man:

a) his intelligence, by the contemplation of a three-fold heaven of truth; viz., God, man, and the world—God, the Author of nature, eternal, infinite, and omnipotent; man, in his immortal, intellectual and free soul; the world according to its last principles, its order, and its laws.

b) his will is perfected by the Ethical Science. It instructs him in his social and political duties. From it, magistrates, doctors, jurists, poets, painters, and artists learn the notion both of law and aesthetics.

Philosophy, is, finally, the handmaid of Theology, a useful weapon for the apologist and defender of Faith. It proves the preliminary data for Faith; the existence of God, the possibility of miracles, etc., and presents arguments of analogy from creatures for Faith. It is a real Introduction to Theology.

There is an unsurpassed pleasure connected with the study of Philosophy. Pleasure or joy comes first, from the fact that an act is performed in accordance to the natural bent. Now, there is nothing more natural to a rational creature than the contemplation of truth, and that is Philosophy. Joy comes, in the second place, from the object. We rejoice not so much because we can *see* an object, but because the object seen is in itself delightful. The object of philosophy is, that it is really the heaven of each and every thing. We may rightly apply it to the words of Wisdom, VII:16, "Non habet amaritudinem conversatio illius, nec taedium convictus illius; sed laetitiam et gaudium."

VI. *DIVISIONS OF PHILOSOPHY*—Every science is divided according to its material object. The material object of philosophy is *every thing.*

Now, in general, a thing either exists in the mind, and there only, or outside the mind; the former is called Logical Being; the latter, Real Being.

MATERIAL
OBJECT
Being or Ens
ENS REALE

ENS RATIONIS
Material—Cosmology
Immaterial—Ontology or
General Metaphysics.

Ens Reale—This first division is composed of entities—things that have the existence outside of the mind. For instance, smoke is an entity, a thing that exists outside of the mind.

Ens Reale—This may be material or immaterial. Immaterial has life. The principle of life by which a thing lives is called its soul.

The science of *real immaterial being* is called *Psychology.*

Cosmology is the science of real material objects.

Theology is the science of an immaterial, living Being who is supreme in all things. If we study this Being by the light of natural reason alone, we have *Natural Theology;* by the light of faith, we have *Sacred Theology.*

Psychology treats of man particularly, but may also treat of animals and plants. Man acts through his soul by his faculties of will and intellect. Man comes from God and goes to God: he goes to God by means of his actions. The study of man's actions in relation to God is called *Ethics.*

Ontology—The science of real immaterial being in general, is known as Ontology, or General Metaphysics.

Ens Rationis
- I. Nature of Ens Rationis
  - a. Notion
  - b. Origin
    - First Intention
    - Second Intention
- II. Different Concepts of Logic
  - Aristotelean
    - No separation from nature to sense; from sense to intellect; from intellect to reason.
  - Kantian
  - Empirical
  - Neo-Scholastic
  - Hegelian
- III. Definition and Object
- IV. Division of Logic
  - Predicability or Ideas
    - a. Signs
      - Nature
      - Kinds
    - b. Notion of Ideas
    - c. Division
    - d. Predicables
    - e. Predicament
    - f. Terms
  - Predication or Judgment
  - Consequence or Reasoning

LOGIC.

I. *ENS RATIONIS*—It consists of entity existing in the mind *only*. Here we must consider: 1. The notion of an Ens Rationis; 2. The origin of an Ens Rationis (first and second intention).

Notion of Ens Rationis—1. In a wide or general sense, it includes everything and anything that can exist in the mind. For instance, you have the idea of a house. The idea exists in the mind, and is, therefore, an *Ens Rationis*. If the house really exists, it also becomes an *Ens Reale*. Every time that we form an idea or an image of anything in our mind, it is an Ens Rationis; if the object really exists, it is also an Ens Reale.

2. In a strict or limited sense—anything that cannot have its existence outside of the mind's consideration, because it is only a form invented by, and existing in the mind. Example: Man is a rational animal. The word "man" in this sentence is an Ens Rationis, if I consider "Man" as the subject.

Origin of Ens Rationis—How do we get an Ens Rationis? The origin of an Ens Rationis is expressed in two notions, included in the first and second intentions. The *first* intention is the concept we get from the exterior object, while the *second intention* is obtained by allowing the mind to go back and put its attention on that concept. For instance, we have the idea "man." How shall I classify that idea? The idea enters my mind; it is then a first intention. I then classify the idea by deciding that "man" is a species of a certain class, thus producing a second intention. In what faculty does this take place? The object is seen by the senses; then it is grasped by the intelligence, and reason, coming back on its own concept, finally produces an Ens Rationis. (From nature to the senses; from the senses to the intellect; from the intellect to the reason.)

Logical Ens Rationis—When there is no exterior reality corresponding to an Ens Rationis, it is called a logical Ens Rationis—often a comparison formed in the mind between what exists there and an object seen in the past.

Again, I have an idea in my mind, and think how I could co-ordinate it with something else. Take the subject's relation to the predicate in any sentence. It is purely and simply a mental division existing in my mind only, a relation between concepts that the mind itself makes—an Ens Rationis. The very notion of an Ens Rationis in the strict sense, is a concept. The relation and comparison that the mind makes may also be called its concepts. The idea first enters the mind; the mind grasps the idea, co-ordinates and arranges it, and this relation between the mind's concepts is called an *Ens Rationis.*

Opposite of Ens Rationis—The opposite of an Ens Rationis is an entity or being that has its existence outside of the mind.

First and Second Intention—The first intention is the thought as it enters the mind. The second intention is merely a reflex action of the first: the mind goes over the ideas first presented, and produces a connection of some kind between them.

II. *DIFFERENT CONCEPTS OF LOGIC.*

ARISTOTELEAN CONCEPT—The senses represent things as they are in nature, and the intellect can get things from the senses. It then proposes these things or ideas to the reason. Aristotle's method was by the process of abstraction.

Origin of Ideas—The senses perceive the object, and the intellect finally gets the idea of abstracting the individual notes. There is no chasm, no separation in the doctrine of Aristotle. It contains sound sense; and even to the present day, is the accepted authority in philosophy.

KANTIAN—Kant's Notion of Ens Rationis—We can best describe it by saying that Kant separated formal truth from material truth. He admitted the world of sense; he admitted that we can obtain knowledge; that we can get phenomena from the mind; but that our knowledge is in the mind, reflecting its own subjective concepts; but that these concepts correspond to representation. All that we know by this method is that the impression made is just what the impression is. Whether the impression corresponds to the reality or not, does not matter, i.e., we do not know it. As a result, Kant's philosophy becomes purely subjective. His logic admits of subjective forms only. Aristotle obtained his results by abstraction; but Kant said that your religion, etc., is born in you, and will gradually develop with your growth. Christ, His Church, history, the sciences, etc., have no relation whatever to the exterior world, according to Kant. As a result, all that I know is purely subjective; and therefore, Ens Rationis is continually suspended in mid-air. With Kant, there is no first intention; the idea connot enter the mind, because the senses cannot communicate the ideas to the mind.

HEGEL—He confounds formal truth and material truth. He claims that exterior things do not exist; that the world of sense does not exist, but that we think of a certain thing, and by our power of thinking, produce it. Hegel's concept is akin to that of Kant.

THE EMPIRICISTS—They knew nothing about Aristotelean logic; they denied abstraction and deduction. This method was advocated particularly by Roger Bacon. He and his followers introduced and believed in the system of *Induction*, and denied *Deduction*. They went from the part to the whole, from the individual to the class. Example: I notice one particular of a species, and draw the conclusion that all the species are like this particular one in every possible way. This system completely destroys universality.

According to Aristotle, everything in the mind is universal, abstracted from material elements, and proceeds from the universal to the particular. Bacon turns this theory upside down.

The Empirical concept, by the fact that it denies deduction, does away with universality, which is the mainspring of philosophy. We have those who followed in the tracks of Bacon—Hobbes, Spencer, Mill, etc. For some, Logic is a part of mathematics; for others, a part of psychology; while for others, it is no science whatever.

NEO-SCHOLASTIC THEORY—This idea of Logic is a confounding of material and formal Logic. (Material Logic or material truth is truth as it exists. *Formal Logic* or formal truth is Logic or truth that is produced by a conclusion drawn.) Example: All the apostles were martyrs. Therefore, St. John, being an apostle, was a martyr. The matter contained in the first statement is not true—all were not martyrs; but, so far as the deduction is concerned, the statement concerning St. John is true. This is formal truth, but not material truth; it is logically correct, but not really correct. The relation or syllogism, contains a formal truth, but not a material truth. Logically, the above statement is sorrect, but in criteriology it is all wrong. Material truth is one thing; formal truth is another. *Formal truth* is the mind's conception of ideas. *Material truth* wants to know if these concepts are correct.

What is *truth?* Truth is an equation existing between the intellect and the mind, between the thing understood and the mind, or between the material truth and the thing in the mind. Truth exists in the mind. We get it from the outside, but that outside must correspond with what is in the mind. We do not know the thing unless we realize that our concept is the same as that outside of the mind. The first concept is called *material truth.*

Formal truth is truth existing between the thing itself and that which is in the mind. We cannot say that we know a thing unless we have first examined whether our idea corresponds to it.

NEO-SCHOLASTICISM considered formal truth and material truth as one and the same thing. This system of Logic did not modify the Logic of Aristotle in any essential manner. Nevertheless, this is an improvement on Aristotelean logic. The new Schoolmen were able to make clear many points which were obscure in Aristotle's works. For example: they determined more accurately than he did the nature of Logic and its place in the plan of the sciences. They did much toward fixing the technical meaning of terms in the modern languages. To this system, Logic also owes the various memory-aiding contrivances by the aid of which the task of teaching or learning the technicalities of the science is greatly facilitated.

III. *DEFINITION*—Logic is derived from "logos"—the mind's concept of things. Logic is a science by which the mind directs or places order in its own actions. It is an art, a directive science of the act of reason itself, by which man proceeds in the knowledge of truth with order, with ease, and without error.

Logic treats of the actions or concepts of the mind (actus mentis). The actions of the mind are threefold: 1. An idea or simple apprehension; 2. Judgment; 3. Reasoning. Hence, this will be a logical foundation later on for a logical division of Logic.

Logic is the arranging of concepts in our minds. "Logos" means a word. Even the word as spoken, is taken from "verbum mentis"—The word of the mind. The exterior word is the outcome of the word in the mind; therefore, we give it the name "Logic."

Logic is a part of philosophy by which we rightly arrange our ideas in their position of truth—a directive science, directing the actions of the mind in the acquisition of truth. Take the example: The man is good. You go back over these ideas, placing them in their proper position, so that you can proceed in the acquisition of truth, or what is called *second intention*—*Ens Rationis*—a reflex act of the mind on its own acts or ideas. All that Logic has to do is put order into our mental operations.

Before the time of Cicero, the word "Logic" was unknown. Quintilian called it the "art of dissertation." Logic is sometimes called a directive science. Is it really a directive science, or is it an art? The question has often occurred as to whether it is an art or a science; whether it is more of an art than a science; whether it is more of a science than an art. To answer this question to the satisfaction of both sides, we may say that is an art as well as a science.

Since the real notion of *art* is that it is an external work, and since Logic treats exclusively of the internal operations of the mind; it cannot in this sense be called an art. However, it could be an art in an indirect sense, inasmuch as the work that art does, is produced from the notion of its perfection of the idea of proportion and beauty; so, the arrangement of our ideas by Logic tends to produce in us a notion of propriety and exactitude. As such, we may call it an art. As the fine arts direct the painter or the sculptor in the actions by which he aims at producing a picture or statue, so Logic directs the thinker in the action by which he aims at attaining truth, or explaining the truths he has obtained.

Logic is properly called a science, because it considers not only the rules which direct the mind in the attainment of truth, but also the causes or reasons why they do so.

Logic is called a directive science. Directive—the force of this word is that, from the very nature of Logic as a science, its work is to direct. This directive force shows not only what the act of reason is, but also directs the active reason. The work of Logic is to direct. In the physical sciences and in anything that can be called a science, Logic's place is to direct that science. Everyone who wants to have ideas regarding the other sciences will find Logic very useful.

By our *reason*, we mean not only reasoning in the sense of syllogisms, but also an act of the intellect.

What does the active reason direct? The answer may seem strange, but the active reason directs the active reason. It is an act of the mind which directs the mind's own actions—it is perfectly reflexive. The mind goes back and tries to direct its *own* actions. The little word "own" makes Logic a reflexive science, or the science of second intentions. In the various actions that the mind can perform, it is the province of Logic to direct it, to place it on the right path. It is not the property of Logic to reason out the origin of ideas; to find out the nature of the mind or what the action of the mind is; it only directs the mind's actions. It does not treat of the values of ideas, whether they are true or false; but only *directs* the actions of the mind.

By this science, man proceeds with order, with facility, and without error. Consequently, it is the province of Logic to direct man to proceed; it teaches him the method of arranging his ideas. Notice the difference between Logic and the other sciences—it occupies itself with formal truth only and does not concern itself with material truth. According to Logic, if the Apostles were martyrs, then St. John was also a martyr.

Probably the best definition of Logic is—a science that enables us to proceed with order, with facility, and without error, in the acquisition of truth.

We know a thing thoroughly by its four causes—formal, material, efficient, and final. *The final cause in Logic* is to proceed in our reasoning without error. The *material cause* is the mental actions.

In Logic, the great difficulty that exists is with regard to the formal cause or object of the science. Why is Logic a different science from Criteriology? Why is it wrong to call it Major and Minor Logic? Everything in Logic is treated under one head—Ens Rationis or second intention. The *second intention* makes the science be what it is, and distinguishes it from any other science. The specification is the Ens Rationis of that science. This is its Formal Cause.

Logic is the science and art which so directs the mind in the process of reasoning as to enable it to attain clearness, consistency, and validity in this process.

Although Logic is the science that treats of definition, logicans are not agreed as to how Logic itself should be defined.

St. Thomas defines it as follows: "Logic is the science and art which directs the act of the reason to proceed without error, confusion, or unnecessary difficulty."

Logic is essentially directive. Therein it differs from psychology, which is essentially speculative or theoretical and which concerns itself only in an incidental and secondary manner with the direction of mental processes. Logic deals with processes of the mind. Therein it differs from metaphysics, which has for its field of inquiry and speculation the whole universe of being. Logic deals with mental processes in relation to truth or, more particularly, in relation to the attainment and exposition of truth by processes which aim at being valid, clear, orderly, and consistent.

IV. *DIVISIONS OF LOGIC*—The division of any science should be according to its material object; hence, the *true division* of Logic should be according to its material object—*idea, judgment, reason.*

The divisions of Logic into Formal and Material, Major and Minor, Dialectics and Criteriology seem to have little argument in their favor beyond that of constant use or repetition by logicians. For if it is true, and it is, that the Formal Object specifies a science, a distinction of the Formal Object will necessarily imply a distinction of sciences; and if two sciences are really distinct, one cannot be a *part* of the other. Now, there is a real distinction between the Formal Object of Logic (Formal, Major, Dialectics), *directing* of *mental* operations, and the Formal Object of Criteriology (Material, Minor Logic), which takes a very distinct view point of these operations, namely, finding out their objective truth and value.

PART ONE.

On Ideas.

CHAPTER ONE.

Sign
- Formal
- Material
  - Natural
  - Instrumental
    - From Custom
    - Convention

SIGNS—A sign is that which can bring to our mind the knowledge of something else. Therefore, it imports two things,

a) It is manifestative and representative,

b) It refers to something else, namely, to something distinct from itself, and to a faculty to which it manifests something distinct from itself. If you walk along a street and see the sign of a shoe (in the form of a shoe), it reminds you of something different—not of a wooden shoe, but of a real shoe. There must be some difference between the sign and the thing signified. (In this instance, the sign might be made of wood or other material, while that which it represents is made of leather, etc.)

DIVISIONS OF SIGNS—Signs may be formal, and material or instrumental.

FORMAL SIGN—A formal sign is one that represents a thing by its likeness, v.g. an image. It brings something to the mind without knowing what the sign is. We know the thing signified, but not the sign. We can know the thing represented by the idea without our knowing the sign.

For instance, when looking through our glasses, we see objects without realizing that we are looking through them. We are not looking at our glasses, but through them.

You have an idea of a house. You don't know exactly what an idea is, but you know what a house it. In this instance, I am not looking at my idea to see what the house looks like, but I look at the house to see what my idea is. The idea is the likeness of a house.

MATERIAL SIGN—A material sign is that which brings to our mind another idea, but not without our knowing the sign itself. For instance, if we did not know what smoke is, we could not say that it is a sign of fire. You might imagine it to be the sign of thunder or something else. You could not say it is the sign of fire unless you know what smoke is and what fire is. In the case of the material sign, you must know the sign before you can know the idea; in this, the formal sign is directly opposed to the material or instrumental sign. Smoke reminds us of fire, not by a resemblance of fire, but in virtue of some other connection between an effect and a cause.

KINDS OF MATERIAL SIGNS—The material sign may be natural or instrumental. The *natural sign*, by its very nature, brings out the idea signified, and is the same for all; v.g. a lion's track, bear's, etc.

In an *instrumental sign,* there is no connection between the sign and the things signified. For instance, language is an instrumental sign. Suppose I do not know the German language, and see the word "wissenschaft," I could not bring the idea of this word to my mind.

Custom has also caused the institution of certain signs for the sake of human intercourse; for instance, when a child sees its mother arrange the table, it is a sign there is something doing—a meal is coming. But these signs are not always infallible.

Conventionality—Commercial signs—for example, signs used by printers in correcting proof matter.

CHAPTER TWO.

On Ideas.

DEFINITION—An idea or concept, is a representation in the mind of something. It expresses the result of apprehension. The idea is in the mind, and the apprehension is the act of getting the idea.

The acts of the mind are threefold: 1. The simple apprehension or idea; 2. Judicium or Judgment; 3. Reasoning. You may have an idea in your mind—simple apprehension; you may compare two simple ideas, and you then have a judgment; you may compare two judgments, and the result is reason.

In an *Idea,* we are occupied with the second intention, wherein the mind knows that its knowledge is exact, without affirming or denying anything about the subject under consideration, and in this it is distinguished from judgment; consequently, the idea is called *simple apprehension.* By the fact that it is an action of the mind, it corresponds to all other actions of the mind. By the fact that we see the essence of things without confirming or denying, we distinguish simple apprehension. We only know the essence of a thing when we know that our idea corresponds to the reality.

The *simple apprehension* or *idea* is a first intention; arrange that in order, and you have a second intention. You have an idea of a house, a fog, a telephone. This is a simple apprehension or first intention. Go back and put order into your idea or ideas, and you have a second intention.

Simple apprehension is an act of the mind—an act of the reason—by which we learn the essence of an object or its nature, without affirming or denying anything of it. In this it differs from *phantasm*, or the object we see by means of our external senses. Phantasm is a sensible image or a material representation of material objects, formed in the imagination by means of the material organ of the brain. I do not see the essence of a building. This, then is a phantasm. I can know the essence of building, but not of this particular building.

When I see a house, a desk, etc., it is an object of my phantasy. It is impressed only on the imagination. It is an image, not an essence. What I see is not the essence, but only a picture formed in my imagination. The mind learns the essence, and here there is the psychological question. To know the essence, the mind getting the idea, is necessary. The exterior sense object is first impressed on the senses, and is called the sense species. Numerous objects are thus acquired by means of the senses, and are categorized in the imagination. In the acquisition of ideas, the mind goes out next and strips the phantasms of their individuality, leaving, we might say, the bare framework: as, doing away with curtains, etc., in a house, the walls and windows. Comparing it with other things, it draws out abstract notes of all those objects that look alike. This is an action on the part of the intellect. The intellect expresses to itself that there is a spiritual image of that object impressed on the mind, devoid of material notes.

CHAPTER THREE.

Division of Ideas.

Every idea has two elements: Comprehension and Extension.

Comprehension—With regard to the notion of an idea, when we know the essence of a thing, we know what the thing is going to be—we know its essence. This is called the comprehension of an idea. Modern books on psychology call it connotation—the notes that enter into the composition of things. For instance: Man is a rational animal. This comprises in itself two notes, man and animal. When we treat of Logic, we must always go back to the second intention. When we want to find out how many different things we can apply these terms or notes to, we have the idea of "rational animal" in our minds. In this instance, the mind goes back on its own action, and tries to see to how many objects it can apply the same term. This is termed the *Extension* of the idea.

Extension—To how many objects does this idea extend? Since every idea can be looked upon from a twofold point of view, the idea of a mental or a spiritual image in the mind, and this idea being extended to others, the most logical division will be according to comprehension and extension of ideas.

According to Comprehension, the division may be given as follows:

1. Positive idea and Negative idea,
2. Abstract idea and Concrete idea,
3. Complex idea and Simple idea,
4. Proper idea and Improper idea,
5. Absolute idea and Connotative idea,
6. Adequate idea and Inadequate idea.

Positive Idea—One that expresses the existence of being: as, man house, etc.

Negative Idea—One that expresses the absence of being; for instance, blindness. Sometimes a thing is called positive when it is more or less negative; for instance, infinite—not finite. It is extremely positive, but its expression is negative. Finite is a negative idea. Take the example of lines cutting a circle. They are only permitted to reach a certain distance; hence they are finite. The idea of finite is then, negative.

Abstract Idea—An abstract idea expresses a quality by itself, drawn forth, as it were; (abstraho—I draw away); it is drawn from the subject to be separately considered; e.g. heaviness, virtue, fragrance. All ideas are, in a true sense, abstract, because the mind cannot get anything except by abstraction. Even the so-called concrete idea is really abstract.

Concrete Idea—Concrete means to perceive by the senses. The concrete idea gives the object as withdrawn from concrete matter, but not from the subject in which this form or perfection exists; e.g. heavy person, good man, fragrant flower.

DIFFERENCE BETWEEN ABSTRACT AND CONCRETE IDEAS—Grammarians differ as to the notion of concrete and abstract. Concrete means to perceive by the senses; abstract, not to perceive by the senses. Aside from the distinctions of grammarians, there are two notions in philosophy—one is the *Aristotelean* and the other, the *Empirical* or *Modern.*

According to Aristotle, every idea is an abstract idea. This is why, in the philosophy of Aristotle, an idea is different from an image, the image in my mind not being an idea, but merely an image. An *image* is always known by its individuating notes; for instance, a day in June. It is always accompanied by the circumstances of time, place, etc., whereas the idea is not; so that for Aristotle the only distinction to be made between an abstract idea and a concrete idea is the distinction of degree of abstraction. Both concrete and abstract are taken away or abstracted from all conditions of matter. For instance, health is a perfection. It designates a form or perfection that is separated from material conditions and quantity, and also separated from the subject in which it exists. A thing is healthy, and the health itself demands that it exist in a subject; so that a concrete idea denotes a form or perfection separated or abstracted from singular or concrete matter, but not from the subject in which it exists. Example: A healthy person—sanus. When I say sanitas—health, I am speaking of a perfection or form that is first of all abstraction from any material or concrete condition; I am not speaking, in the second place, of a *subject* in which health exists—sanus. I am not speaking of the health of Peter or of John or any other particular person —not of any definite material health in any individual. I am abstracting health from its individuating notes and from the subject in which it exists. In *grammar,* these are considered as abstract ideas.

The *Modern or Empirical System* says that abstract ideas and images are the same. In this case, it is merely a question of concrete and abstract ideas—not one taken from abstract, and the other from concrete elements.

The Modern Empiricists deny all abstraction. The tendency is to do away with all knowledge that transcends the world of sense. For them, a concrete idea is an object in the imagination.

Simple Idea—A simple idea is one in which there is but one form or distinction; thus, we say the word "man." There is just one notion included in this idea.

Complex Idea—A complex or composite idea is one which, in itself, is reduced to a certain unity, but contains a multiform distinction. Example: A just man. This is composed of two simple ideas—the idea of justice and the idea of man.

Absolute Idea—An absolute idea is one that denotes something that exists by itself. For example: Take any substantive in our language. All substantives are absolute ideas.

Connotative Idea—A connotative idea is one which would not stand alone; as, just, good, bad, black, white, etc. All the adjectives and the adverbs are connotative ideas. They must be attached to or connote something.

Proper Ideas—We have a proper idea of a thing when the mind or the intellect understands that thing by a form that belongs to the mind. If our mind forms its idea from the material within the mind itself, the idea is proper. Proper ideas can be held only in regard to natural things —not supernatural.

Improper Idea—An improper idea is one which the mind gets and the intellect understands, but not by any form that is inherent to the mind itself. For instance, the knowledge of God. We have no knowledge of God from our own minds, but this knowledge is had from the things around us. All our knowledge is analogous. We know what justice is, and we attribute it to God. All knowledge of the supernatural comes to us through the material forms and elements around us. When a person has an idea of the Incarnation, the Redemption, etc., these things do not enter the mind directly. The essence of God does not enter my mind directly, but I get my ideas concerning the supernatural from the exterior world around me. Therefore, all knowledge of the supernatural may be classed under improper ideas. Very often, we know a thing by its effects rather than from its causes.

Adequate Idea—When I know a thing in so far as it can be known, I have an adequate idea of it. The knowledge that I can have of a thing, so far as it is knowable, is an adequate idea of that thing. We really can have no adequate idea of anything. There is nothing—not even our finger nail, that we can have an adequate idea of. "A man's study is from sun to sun." There is nothing we can know so far as it is knowable. The higher we go in knowledge, the more true is this assertion. Adequate knowledge is scarcely possible. If we were to study all our lives, there would be something about the subject that we could still learn.

Inadequate Idea—When we know a thing and know it well, but not in such a way that there would be an equation between the thing itself and our knowledge, we have an inadequate idea. When we know a thing imperfectly or relatively, our idea of it is inadequate. Inadequate ideas may be of two kinds—distinct and confused.

Distinct Idea—An idea is distinct when we know a thing sufficiently well to distinguish it from any other.

Confused Idea—An idea is confused when we are not able to distinguish it from others of the same class. For instance, if I know a thing by its genus or species; as, "Man is a living creature." This is not sufficient to distinguish "man" from an animal or some fern out in the woods.

A confused idea is not necessarily an erroneous idea. The only way it could be erroneous is if it would lead to error.

An idea is confused when I cannot distinguish it from others. If you see a thing moving in the distance or hear footsteps in the dark, you know something is moving. It may only be your pet cat, but the idea is an idea just the same; it is a confused idea.

EXTENSION—An idea has also extension—not the notes it includes within itself, but the number of objects to which it extends.

Under this heading ideas may be divided as follows:—

Extension
1. Singular
2. Particular
3. Collective
4. Universal

Extension means the total number of individuals to which the idea extends or applies. The extension of the concept "man" is "all men"; that of "animal" is wider still, extending to all men and all brutes. We know that the greater the extension, the less the comprehension; and vice versa; because the more numerous the qualities apprehended, the fewer the individuals that will possess them all. Thus, the genus "animal" has more extension but less comprehension than the species "man." "Animal" has more extension than "man," because there are more animals than men. It has less comprehension, because the term "animal" signifies fewer notes than "rational animal" or "man."

Singular Idea—A singular idea is that which applies to only one individual or object; as, Peter, Paul, etc. If you have the notes that go to make up the individual—the material elements—form, figure, position, dress, nationality, lineage, and name, then you have what are called the seven individuating notes or qualities. No two individuals have the same notes.

A singular idea is one that expresses a definite single object; e.g. this book, that army, that gold, James, the Angel Gabriel, the United States (meaning this one country).

Particular Idea—A particular idea denotes a certain nature, class, or species limited to a certain number; for instance, some men. In Latin, "aliqui homines"—the class "man," but restricted to a few.

A particular idea is one that represents one or more objects without determining which; as, a man, an army, a Nero, a spirit, three books, some states.

Collective Idea—A collective idea is one that represents something that is in itself multiplex; but, by reason of the order existing, is taken as one. Example: an army, a family. The physical units that go to make up an army or a family are multiple, but by reason of the orders of the hierarchy in the family, the mother is generally considered as being the head. With those in subordinate, she constitutes the family, which is taken as one body.

Universal Idea—An idea is universal when it expresses a note or notes common to many objects, found in each of them, no matter how much these objects may differ in other respects; e.g. "animal" and "rational" are notes common to all men. They are conceived in the universal idea "man," and each corresponds to a universal idea.

We might say that all Logic and all philosophy hinges on the true idea of the universal. This was the burning question of the Middle Ages, and remains to this day the parting of the ways between Scholastic philosophy and Modern philosophy. The right understanding of this question is all-important in philosophy. While treating it in Logic, we meet it in General Metaphysics and Ontology.

A universal idea is one that can be in many individuals, and used as a predicate of them univocaly (unity or oneness), and separately. A universal idea is a unity, not a multiple. It has the aptitude to be in many. It may be in many; and here we have the notion of the form of universal ideas. The only way it can be in many individuals is in the mind.

The term "note" designates anything knowable in an object. We may say "Man is healthy." We speak of a "healthy color." The color is not really healthy in itself, but only the sign of health in man. Therefore, a universal idea may be expressed of many things taken univocally.

We shall treat this subject under three heads:

1. The Aristotelean Concept,
2. The Modern or Empiric Concept,
3. Division of Universal Concept.

ARISTOTELIAN CONCEPT—If we consider the name, "universal" in Latin, French, or English—"unus versus"—it means one against the other. The Germans have a sort of misleading expression—"allgemein"—collective.

The real definition is:

1. It is a unity with an aptitude to be in many things, and of being predicated of them univocally and separately. It is a unity—a oneness in nature. It is, consequently, a first intention; as, man, house, etc. It is a unity of substance, nature, or form—something we may have an idea of. This unity is the first intention to be treated later in General Metaphysics and Ontology. This abstraction must be made: if it is not made, there will be no unity. It is an idea, not a picture. In this regard, the philosophy of Aristotle cannot be contradcited by any other philosophy.

2. With Aristotle, the idea is an objective idea or concept: it comes from the outside; whereas, for the Modernists, therefore, for those who follow the ideas of Kant, it is a subjective idea.

3. Its aptitude to be in many things. Aristotle does not say it is in many things, but of its nature, it may be in many things. Take, for instance, the notion or idea "sun." There is only one sun, but still the idea is universal—it may be applied to many. The same notes could be attributed to other substances, even if there is only one "sun." A universal idea does not mean that the idea is *in* the things—it may be an aptitude.

Negative Aptitude and Positive Aptitude—Here again we have the same distinction to be made. In aptitude, we have the first and the second intention. Second intention is an ever-recurring idea in Logic, and because it does come up so often, not much is made of it. It is one of those fundamental ideas we lose sight of, because of its frequent recurrence. It is looked upon with scant interest, because people are supposed to understand its meaning. I doubt if many really do understand it. I wonder if one-third of the Logic books have made the most of this one idea—second intention. Wherever there is Logic, we must have second intention.

The aptitude of a unity to be in many can be positive or negative aptitude.

Negative aptitude means non-repugnance. Take the instance of a "rational animal." Here you have a first intention. This does not say whether it is in many things; it is simply an idea. All it expresses is non-repugnance to be in many. It does not express an actual contradiction, nor does it deny the possibility of being in one or many.

Positive Aptitude—This is where the second intention comes in. By a process of comparison, this unity is and can be attributed to many, but there is a reflex made on this unity. It is the first intention revolved in the mind; and if it can be attributed to others, we have a second intention. It has the aptitude to be in many things. Furthermore, we can distinguish it from a singular idea or a collective idea. A *singular idea* expresses only one idea, while the universal idea is capable of being in many things. The difference between the universal idea "man" and the collective idea "army" is—both unities, both have the aptitude to be in many. "Man" may be applied to all individuals of that species, but "army" cannot be distributed among the individuals; the general cannot be the army, neither can the captain, etc.

Can be predicated—To be used as a predicate. Example: Peter is a man. Man is predicated univocally and separately without reference to any determined number.

"Univocally" distinguished from "equivocally" and "analogously." For instance, the word "being." We do not consider a chair as being in the same light as we speak of God or of man. *Univocally* means in the same sense. *Separately* means it may be attributed to different ones. In a collective idea, it cannot be attributed to the individuals separately.

Without reference to any determined number—In a universal idea, there is no determined number because "universal" abstracts from the notion of existence. There can be no question of number, because universal means "above the idea of number." In a universal idea, the idea may be attributed to all or to each separately.

Common Idea—The universal idea must also be distinguished from another term that is sometimes called a common idea. Take, for instance, a house. It might belong to Jane or Rebecca, but it belongs to no other. A thing that is common to many means that it may be applied to just that number, and no more. If this is the case, it cannot be a universal idea. The same is true of the Divine Nature. Nature, in this sense, is not a universal idea, although Scotus Erigena explained it in this way. The nature of the Blessed Trinity is not universal; it may be attributed to many—the Father is God; the Son is God; and the Holy Spirit is also God. Nature, in the Blessed Trinity, is not a universal idea; therefore, it cannot fall under the idea of universal. If this idea were universal, it would be no mystery.

False Doctrines—I do not believe in spending precious time on false doctrines—doctrines that are opposed to the truth, because anyone who has a knowledge of true doctrine can place the false doctrine in the mirror of truth, and he will soon see the flaws. A few words, however, may not be amiss.

UNIVERSAL IN MODERN PHILOSOPHY—This system has no universal. Why is there no universal in Modern Philosophy? In answering this question, we must consider three things:

1. The notion of universal.
2. The difference between the Modern concept and that of Aristotle.
3. The value of so-called Modern Philosophy—the Modern Philosophical universal.

Modern philosophers have no universal, because they are physicists. Natural scientists do not believe in abstraction in the sense we have already explained. They have no Metaphysics. To have a clear notion of their so-called universal, we must get their conception of what an idea is.

According to the Modern Empiricists, a *singular idea* is a sense image, presenting an individual object according to its individual notes. For instance, the tree image. This is a complex image or idea, because it arises from many simple notions—the notion branches, the notion leaves, the notion roots, the notion trunk, etc. This is a singular idea, yet complex. The idea of tree is singular; its parts are complex, because the complex idea arises from many simple ideas.

According to the Empiricists, a *universal idea* is a sense image, in which from any singular notes are retained permanent and constant ones, expressed by a given name—a number of singular ideas or sense images, of which some change, some are permanent, others are set aside, but in the collection of these various notes, some notes continually occur. These permanent notes of sense image, placed under one given name, constitute the Modern Empiricist idea of universal.

Taine takes the example of a tree. He says you must have had, prior to it, the singular idea, as a tree, etc. Then some notes always remain; for instance, you have a cherry tree, an apple tree, an oak, a spruce, etc. These are so many singular sense images, but all are different. There are some images that change, for instance, cherry or apple: set them aside. After you have done this, you find there are certain notes remaining; all trees have branches, roots, trunk, etc. Unite these permanent notes under one given name, and you have the notion of the *Empiric Universal.*

DIFFERENCE BETWEEN ARISTOTELIAN AND EMPIRICAL UNIVERSAL—What is the difference between the Modern Empiricist and the Aristotelian concept?

The Empiric idea is extrinsic; you can picture it. For instance, the tree. You can picture it as having fruit, stems, leaves, etc. The Aristotelean idea of the universal is intrinsic. For instance, I say, "Man is free." Any one can form a picture of what a free man will do. You can draw a cartoon of a person and say he is free; but you cannot picture a free man. So, the first difference is that the Empiric idea is extrinsic and may be graphically described, while the Aristotelean idea is intrinsic, and cannot be described.

According to Aristotle, a universal idea is essential to a thing: while, according to the Modernist, it is an image. If you take one name to represent a number of things; for instance "man," and that not an abstract notion, you have the *Empiric Universal idea.*

VALUE OF EMPIRICAL UNIVERSAL PHILOSOPHY—We must avow that the Empiric Universal presupposes the Aristotelian Universal, because we set aside the varying notes and to retain others, you must have the notion or idea of *notes.* Leaving off notes that are varying, and retaining those that are constant, you have a universal idea, because constancy is a universal idea. At the same time that these philosophers deny abstraction, they make use of it. The ideas *constant, varying,* and *change* are all universal ideas.

These philosophers must retain the notion *being. Being* is universal. If a thing that changes is varying, the thing itself must be universal.

In reality, their universal is not universal, because the same notes regularly co-exist and other notes change. For instance, a body has weight. That is a singular idea, and the very fact that the notes themselves change shows that they are singular notes. The thing that changes or goes away must be individual or particular. Therefore, their idea of universal is nothing more than a collection of individual ideas.

CHAPTER FOUR.

ON PREDICABLES.

How is the universal divided? There are five universals. The ancients called the universals *"predicables"*; and since it is the mind that connects or makes the comparison between the ideas, predicable is nothing else than second intention.

PREDICABLES—All universals may be ranked under five heads, called the five heads of predicables, because it is always in one of these five ways that a universal idea is predicated of the subject.

1. *ESSENCE*—Universal, representing the complete essence, is called species. Under this head, we may consider what is apprehended as being common to many objects, found in each of them and, therefore, predicable of them all in exactly the same sense. It may be the whole nature, the essence of those objects, i.e., all that without which those objects cannot exist or be conceived. For instance, it is the nature or essence of all men to be "rational animals"; unless I conceive it as being both "rational" and "animal", I do not conceive a man at all. This common essence of a class is called a *species*. The species, therefore, is defined as all that constitutes the common nature or essence of a class of objects; e.g., "man," "rational animal."

2. *INCOMPLETE ESSENCE*—A universal may represent the incomplete essence, giving some part of the essence, not the entire. In this instance, it may give the essence, but only such a part as needs completion. It may express a part only of the nature common to many objects. Thus, when I conceive "animal," I conceive only a part of man's nature, a part to be found in other species of objects as well, viz., in brutes. "Rational" is the other part of man's nature; it is not found in brutes and, therefore, distinguishes man from the brute. This universal concept which seizes upon what is common to different species, is the idea of the *genus;* e.g., "animal" is the genus, to which belongs the two species "man" and "brute." Man is a rational animal, using "rational" as a predicable of the subject, representing the essence completely.

3. *SPECIFIC DIFFERENCE*—The universal concept which expresses the peculiar note by which one species differs from another species of the same genus is styled the specific difference; e.g., "rational" is the specific difference of the species "man" as distinguished from the class "brute."

4. *PROPERTY OR ATTRIBUTE*—A thing, predicated of another, joined to the essence as necessarily flowing from this essence, is called proprium—the property or attribute of an essence. For instance: "Man is a laughing animal."

When the concept expresses something that flows or results so necessarily from the very essence that the very essence cannot exist without it, and that note never exists but in such an essence, such a note is called a property or attribute of that essence. Thus, the "power of laughing," the "power to express one's thoughts by articulate speech," cannot be found but in a being that is both "animal" and "rational"; and they result as natural consequences from its compound nature. The use of them may be accidentally impeded, as is that of reason itself in the infant and the idiot; but they belong to human nature as such, as distinct from other natures and are, therefore, properties of man, proper or peculiar to man. Properties need not be conceived in order to apprehend the nature from which they flow; thus, to conceive man, I need not think of his risible power.

5 *CONTINGENT OR ACCIDENTAL*—The essence may be contingent or accidental. For instance, Man is learned, pious, etc. As a rule, the properties that do not necessarily flow from the essence, but may be there, are called *accidents*.

The universal may express what is found in one or many individuals of the same class, or even perhaps in all of them, yet in such a way that it could be absent without the individuals' ceasing to be of the same nature. In that case, it expresses an accident of the species. For instance, a man may be white or black, tall or small, gentle or fierce, young or old, a European or an American. All these are accidental notes of man. All men are larger than ducks; and yet, if a dwarf should be born who, when full grown, should not be so large, being a rational animal, he would truly be a man, his particular size being only an accident, not a property of his essence.

That which happens to the subject without changing its nature one way or another, is called an accident. It is a universal, and expresses what is found in one or many individuals of a class.

No matter what sentence you make or what ideas you connect, they must fall under one of the five points mentioned above.

CHAPTER FIVE.

ON PREDICAMENTS.

Predicaments are first intentions. They refer also to universal ideas, in so far as it is a first intention, because it has the aptitude to be in many. Every first intention we may have falls under one of ten classes, called the ten categories or predicaments.

Everything of which we have an idea is either a substance or an accident. The notion of *substance* is that which exists in itself, while an accident cannot exist within itself; for instance, "white" cannot exist within itself, but is an accident of some substance. The accident cannot exist independently of the subject, but must be used in connection with some substance to form a subject.

CATEGORIES—Aristotle has pointed out ten classes under which all beings can find a place; these are known as the categories or predicaments, because all that can be predicated of any being is found to belong to these ten categories. Such predicates are found in the answers to the following ten questions:

1. What is the being?
2. How great?
3. What qualities has it?
4. Whose is it?
5. What does it do?
6. What is done to it?
7. Where is it?
8. In what posture?
9. When?
10. How equipped?

When we ask what a thing is, the answer will be either that it is a substance, i.e., something existing in or by itself, or it is something added to substance; it must be one or the other. Substance is the first category. If a thing is not a substance, it is called an accident, i.e., something added to a substance. Example—The table is good. Here we have the substance "table." What is the being? What is the accident "good?" The table is large. "Large" expresses quantity—How great? The table is mine. Relationship—Whose is it? The table is broken—passio—recipient of an action—What is done to it? The table is in that room? Situation—Where is it? The table is moving. It probably would be, if it were in the region of the ouija board. Moving denotes action. What does it do? The table is here now. When? The table is covered. How equipped? These are the ten *Predicaments*, the substance existing in itself or an accident expressed of it. "Predicament" means category—to accuse. The only reason that we speak of Predicaments in Logic is that they may be used as predicates, and when so used, are universals. Here we consider them almost entirely as second intentions. They are in themselves first intentions, but when united to another thought, they form second intentions.

We say, for instance, "The table is large." Large being an accident, must adhere to some being, but this being need not always be in the subject. Aristotle tells us that an accident, by its nature, demands that it should be in the subject, but there may be exceptions to this condition. The nature of a subject, however, demands that it be in itself.

SUBSTANCE—By our senses, we perceive things in the concrete, substance and accidents united. By our intellectual power of abstraction we, from the first dawn of reason, distinguish the quantity, the qualities, etc., of an object from the object itself, e.g., the size and color of an apple from the substance of an apple. We conceive the object as existing in or by itself, but the quantity, etc., as existing in the object. Philosophy is only the systematic teaching of common sense. Speaking philosophically, we say that a substance (*substans*—standing under) is that which exists in or by itself, and whatever does not thus exist, we call an *accident*. An accident, therefore, is that which cannot exist in or by itself, but exists in some substratum.

When we say that substances exist in or by themselves (per se), we do not mean that they have no cause, that they exist by their own power (a se). This was the leading error of Spinoza, who, making all substances thus self-existing, made them all necessary and, therefore, identified all things with God.

An accident affects the subject intrinsically or extrinsically:

1. *Intrinsically*, it may affect the substance absolutely or respectively. (a) Absolutely, it may affect the substance by reason of the matter, viz., quantity; or it may affect it by reason of the form, viz., quality. (b) Respectively, it affects one thing as connoting another, viz., relation.

2. *Extrinsically*, it may dominate the substance by reason of something else which affects it, viz., its action, passion, place, time, posture, habiliment.

CLASSIFICATION OF SUBSTANCES—Substances are distinguished:

1. *Simple Substances*, i.e., such as have no parts, and *Compound Substances*, i.e., such as have parts.

2. *Complete Substances* and *Incomplete Substances*.. The incomplete substance is destined by nature to constitute with some other being a substantial unit; thus, the human soul needs the body to constitute man. The complete substance is not destined to such union, e.g., an angel, a plant; it is, therefore, the complete principle of all its natural actions. A complete substance is called a *supposit;* a supposit endowed with intellect is a person. As a human soul is not a complete substance, it is not a person. The Infinite Being, since it is complete and intelligent is, of coure, a personal Being.

Since accidents exist in their substance, actions, which are accidents, belong to their supposit; it is the supposit which acts—actiones sunt suppositorum. The parts and powers of the supposit are not so properly said to act as to be the instruments by which the supposit acts. Thus, we say, "A man walks," not "His feet walk"; "I am thinking," rather than "My mind is thinking"; "We see with our eyes, feel with our hands," etc.

We have defined *accident* as being that which cannot exist in or by itself, but needs a substratum or substance in which to exist. By saying that accidents cannot exist by themselves, we mean that they cannot do so as nature is now, or according to the actual physical laws. It is not, however, impossible for the Creator to maintain certain accidents in existence without a substance. God can do all things that involve no contradiction; therefore, He can keep in existence without inhesion in a substance such accidents as only imply a tendency, an exigency to inhere, and do not, in the very concept of them, imply the act of inhering or actual inhesion in a subject. As a matter of fact, the Church teaches that, after the Consecration of bread and wine at Holy Mass, the substances of bread and wine cease to exist, and still their accidents of quantity, color, taste, etc., are preserved in existence by the super-natural action of the Divine Will. In this doctrine, there is nothing against reason. For the accidents have being or entity which is really distinct from the entity of the substance, since it may be changed while the substance remains the same. The substance supports that entity, but God can keep it in existence by His will directly without using the substance to produce through second causes, i.e., through His creatures, He can produce the same directly by His mere Will whenever the effect is not of such a nature as to imply a created cause. Now, although the accidents of bread and wine naturally inhere in those substances, still human reason cannot see that quantity, color, taste, etc., essentially imply a substance to exist in.

THE PORPHYRIAN TREE—Logicians, when speaking of predicaments and predicables, usually mention the Porphyrian Tree. This tree has no great interest, except in as much as it enables us to see the relation of one thing to another. (Porphyry lived about the year 4 B. C.)

BEING

Genus plus Specific Difference—Species

Living Thing plus Sensitive = Animal

SUBSTANCE

Substance plus Corporeal = Body

BODY

Animal plus Rational = Man

Body plus Organic = Living Thing

LIVING

ANIMAL

MAN

INDIVIDUALS

Peter John James Paul Charles

The above diagram also illustrates the relation of the first and second intentions. Example: Man is an animal. Animal is a living thing. A living thing is a body. A body is a substance. A substance has being.

In this diagram, the trunk of the tree contains the genera and the species; the branches show the specific differences, while the roots exhibit the individuals.

Man is an *animal*. "Animal" is called a genus because:

1. It is a universal, and the definition of universal is fulfilled in the word "animal."

2. It does not say in the entirety what man is, although there is a connection between the word "man" and the word "animal," but "animal" does not distinguish man from other beings. "Man," in the first concept, is a living body—a living, sentient being; consequently, he is an animal. So, then, animal is a *genus;* it may be attributed to many, but is attributed as a part to be determined—it is an incomplete part or a part to be completed.

When we conceive a note common to two or more genera, e.g., "living," which note belongs to animals and to plants alike, we have then a higher genus, of which the former genera may be considered the species. "Body" expresses a still higher genus, for it is predicated not only of living, but also of non-living substances, such as stones and metals. Substance is a higher genus still, to which not only bodies, but spirits, belong. Being is the highest in the scale; it transcends genus.

Reversing the process, we may start with the highest genus; taking substance next, we have corporeal and incorporeal substances; the species "body" becomes a subordinate genus, of which "organic" or living, and "inorganic" will be the two species. Of organisms or living thing, the species will be "sensitive" and "insensitive." Of animals, we have two species: "rational" and "irrational"—man and brute. We have many species of brutes, but not of man; for, while brutes have very different properties, all men have the same essence and the same properties. These differ, not in kind, but in accidental degrees of perfection. Therefore, "man" is not a genus, but the lowest species: "animal" is his proximate genus. The genera and the specials between the highest and the lowest are called subaltern, subordinate, or intermediate.

SPECIES—Man is a rational animal. When we use the predicate in such a way that it expresses the exact notion of the subject, it is called the species. It is that predicate of the subject which gives the nature of the subject.

Species may be used as a subject or as a predicate: it may, therefore, have the notion of subjectibility. Since species is contained in genus, it brings with it the notion of subjectibility; in this case it is inferior to genus. The word *"subject"* is derived from "Subjicitur," subject to or inferior to. The predicate of every sentence is universal, while the subject usually is not. You may say, "John is a man," but you cannot say, "John is Peter." You may say, "Man is an animal"; "Man" is subjected to a predication, and is, therefore, the subject of the sentence.

The *predicate* is that which can be said of, or predicated of the subject. It is universal, or, at least, more so than the subject. The distinction in a species is not a distinction of class, but of number.

CHAPTER SIX.

On Terms

DEFINITION—The oral expression of an idea is called a term.

What do we mean by "term"? It is a sound produced by the articulate voice to express to others our internal sensations or concepts. It is not merely a gesture; it is a sound, an articulate sound, pronounced by the voice in order to express to others our internal concepts. You could not say that a parrot talks, because no being except man can express internal concepts.

It is called: 1. a sound, and by this we distinguish it from gesture; 2. it is produced by the voice—an articulate sound. The neighing of a horse or the braying of a mule is a sound, but it does not express an internal concept. They are sounds, but not terms, although the cackle of hens and the crowing of roosters, etc., could accompany certain notions to us and express among themselves their instincts, but not their concepts. To manifest the internal state of the soul, it must be the result of abstraction, which faculty belongs to man alone.

CLASSIFICATION OF TERMS.

1. Nature or notion of Terms;
2. Division of Terms.

NATURE OF TERMS—There is a great difference between an idea existing in the mind and an idea expressed orally. The idea orally expressed is called a term.

DIVISION OF TERMS—As a term is nothing else than the oral expression of ideas, according to the division of ideas, terms may be divided. They may be simple, composite, equivocal, univocal, finite, and infinite.

EQUIVOCAL TERM—When the meanings are entirely different without any connection between them the term is equivocal: for instance, the word "box" may be applied to a case for articles or it may mean a blow on the head.

UNIVOCAL TERM—When the meaning of a word is exactly the same, the term is called univocal: as when we give the name "box" to a case or receptacle of any size or shape.

FINITE TERM—A finite term represents an idea with definiteness.

INFINITE TERM—An infinite term represents an undetermined idea.

DIFFERENCE BETWEEN TERM AND IDEA—The idea is the thing immediately coming to our minds; snow, for instance; while the term or oral expression is more remote. You have: 1. the thing in your mind; 2. the oral expression of it. You also have: 1. the immediate relation of the mind to the thing; 2. the oral expression of it.

The idea is a formal sign of something. We can know "snow" without knowing the idea by which we recognize "snow."

A word is a material or instrumental sign, which represents nothing unless we know the sign itself. *Terms* are material or instrumental signs. An *idea* is prior to a term. By an *idea,* we express to ourselves the thing which we have in mind. By a *term,* ordinarily understood as language, we express our *ideas* to others.

PART II.

Just as in ideas we considered:

1. The ideas in themselves; and
2. The ideas in regard to their oral expression;

So in Judgment we have:

1. The judgment in itself;
2. The judgment in its oral expression, or proposition. (A judgment expressed in words is called a proposition.
3. On Definition.
4. On Division.

CHAPTER ONE.

On Judgments.

A judgment is an act of the mind perceiving—not by any blind impulse nor by the senses, but this perception is purely an abstract action—the identity or non-identity or two concepts.

The identity of two things consists in the relation of equality between their two objective concepts. When I express the judgment, "Man is mortal," I do not mean that the act by which I know "Man" and "mortal" are identical or diverse. This would be a *subjective concept.* I do not say there is an identity between two subjectives (a third intention), but between two objectives (two first intentions). When I say, "The snow is white," I express the identity of "whiteness" with "snow." It does not mean an act by which I know "whiteness," and an act by which I know "snow"; but I perceive the identity or diversity between two first intentions; and seeing this relation, I have a second intention.

Aristotle defines judgment as an act of the mind, or an act by which the mind expresses the identity or diversity between two objective concepts by composing *or* dividing (with special emphasis on the word "or.")

1. It is an act of the mind and, as such, corresponds to an idea or reason.

2. In what does the act of the mind consist? It is an act by which the mind perceives to itself identity or diversity between two objective concepts; as, Man is mortal. "Man" and "mortal" are two objective concepts.

3. How does the mind perceive the identity or diversity between two concepts? By composing or separating—examining the notion "Man" and the notion "mortal." If I were to say, Man is immortal; Snow is rain, etc., these would be diversities.

The oral expression of a judgment is called a proposition or enunciation—the expression of an act of the mind in which we find the relationship—identity or diversity—affirmation or denial—between two ideas. The relationship of identity is expressed by an affirmation; the diversity is expressed by a negation.

ELEMENTS OF JUDGMENT—The elements of Judgment are material.

MATERIAL ELEMENTS—The material elements are those things that go to make the judgment. Example: Man is mortal. We have here three distinct elements that occur in every judgment—the subject, the predicate, and the copula or connective. The subject is that about which something is said. The predicate is that which is said of the subject. The element that unites or compares the subject with the predicate is called the copula. The subject and the predicate are the material elements of a judgment or a proposition, while the copula is the formal element.

FORMAL ELEMENT—The formal element is that which makes the proposition really what it is, that which expresses the relation between the subject and the predicate.

What is the element that is considered formal? It is the copula, that which expresses relation between the subject and the predicate—the verb "to be." This is called an auxiliary par excellence. In fact, there is really no other verb than the verb "to be"; all the others are derived from it. Examples: The man runs—The man is running. It snows—It is snowing. All verbs are forms of the verb "to be." In some languages, for instance the French and the Italian, the verb "to be" is not expressed. Some authors claim that the Latin verb "esse" is a substantive. This is wrong. Others claim that "to be" should be used *only* when the subject exists. At that rate, you could not say that blindness, for instance, is a privation, because it would be an entity. You could not predicate a non ens if "esse" were used only to express a thing that is in actual existence. The idea of "esse" does not necessarily include the notion of the real existence of a subject. It is not a transcendental being, nor does it imply the notion of existence. "God is" means that God is existing. Therefore, the copula is not the same thing as the predicate of a sentence, nor does it imply that the subject of the copula actually exists.

The three elements—subject, predicate, and copula, are in every judgment. The subject is always a noun and the predicate is always a verb. What is a noun? A noun is a word with a signification which it has from convention (human institution) without any reference to time, no part of which signifies separately. The man who gave snow its name, could have just as easily called it "rain." He used the word "snow." He told it to someone else, and this is the way all nouns derived their origin. Once a notion or a name is transferred to a succeeding generation, it becomes a common usage.

What is the meaning of "without reference to time?" This means that there is no question of present, past, and future of motion. You call man, horse, etc., a noun, and it is here that a noun may be specifically distinguished from a verb, which always signifies time. The reason for this is that the noun is always taken as something subsistent—existing. Subsistence and existence abstract from the notion of motion, and time is motion;—from the notion of "here" and "now." The subject of a judgment or a proposition being a substantive, it is expressed independently of the notion of time.

"No part of which signifies separately." By this we distinguish a noun from a proposition; for instance, in the proposition, "man" has a separate signification, and word "mortal" has a special or separate signification. This is called *enumeration or speech.* No part of the noun has a separate signification. In English, we do not have many composite or compound nouns, but if we take up the German, we find it very rich in composites; for example, "Haus Herr" could not be "haus" or "Herr," unless a different meaning were attached to it. Here we must use both words to get the correct meaning. "Res publica salvatur." In this instance, you could not separate "res" from "publica." We may have very long words used as nouns; but when used as nouns, they must be used compositively—they cannot be broken. Here is a good example, especially for its length: "Dievierwaldstaetterseedampfschiffartsgesellschaft." In English, we would say, "The Steamboat Corporation of the Lake of the Four Cantons."

DIFFERENCE BETWEEN IDEA AND JUDGMENT—When you have an idea, you perceive the essence of a thing without making any comparison; whereas, in a judgment, you compare two first intentions to find their identity or diversity.

Note: If the Predicate is attributed to the Subject, in the nominative case, it is called Predication in *"sensu recto"*; if in the other cases, it is called Predication in *"sensu obliquo."*

KINDS OF JUDGMENTS—On the part of the subject who is judging, you can have a certain, uncertain, prudent, or rash judgment, according as the mind adheres to it without fear of error, or with a fear lest it be wrong, or is basing itself on a solid motive, or judges without such a motive.

On the part of the object, a judgment can be immediate or mediate; immediate, if the mind sees the relation between the predicate and the subject without any further reasoning; mediate, if the relation between the elements is made known by means of reasoning.

Most celebrated is the division of judgments into analytic and synthetic. Judgments are analytic if the predicate is contained in the notion of the subject, either as a genus, or a specific difference or as a proprium; thus by analysis of the notion man, I find that he is an animal, rational and can laugh. A judgment is negatively analytic when the very notion of the subject excludes the predicate; as for instance, a circle is not square.

A synthetic judgment is one in which the notion of the subject does not include or exclude the idea of the predicate, as when I say that man is white; thus the relation between them can be had only by experience.

Not without the inconvenience of a contradiction then did Kant introduce a middle judgment which is not one nor the other:—what he called synthetic—a priori. For either the agreement of the predicate with the subject is known from experience or independently of it; in the former case it is synthetic, and in the latter it is analytic.

CHAPTER TWO.

On Propositions.

1. DEFINITION:—Enunciation is the verbal expression of a judgment. It is also called a PROPOSITION. It is a statement announcing one thing about another; and if we say that announces truth or falsehood, we have a descriptive definition, giving its nature by the properties it has.

Since propositions are only the external manifestations of judgments, the properties and the elements of both are the same; viz., the subject, predicate, and the copula, as was mentioned above in the chapter on judgments.

Since the two things that make up a proposition are its two elements: material and formal, it follows that the two division of propositions can logically be taken from these two, according to the schema which is shown below.

DIVISION OF PROPOSITIONS.

- I. Material
  - a. Relation of Predicate to Subject
  - b. Relation of Subject to Predicate
  - c. Subject with Predicate or Predicate with Subject
    - One
    - Complex
      - Hypothetical
      - Conjunctive
      - Disjunctive
      - Causal
- II. Formal
  - Affirmative
  - Negative
  - True or False
  - Modal

We say that a proposition is composed of two elements or sets of elements. They are the material elements and the formal elements. Where the subject and the predicate are united or divided, we may have the division taken from the relation of the predicate to the subject, or the relation of the subject to the predicate, or with both; consequently, we have three divisions.

I. *RELATION OF PREDICATE TO SUBJECT*—The proposition taken from the relation of the predicate to the subject may be:

1. A Necessary Proposition;
2. A Contingent Proposition;
3. A Possible Proposition;
4. An Impossible Proposition.

This is with relation of the predicate to the subject; namely, that the predicate may be in the subject or not.

NECESSARY PROPOSITION—A necessary proposition is one in which the predicate is necessarily included in the notion of the subject. It is one in which the relation of the predicate is essentially included in the notion of the subject; for instance, The circle is round; Man is a rational animal.

CONTINGENT PROPOSITION—The predicate *may* be in the subject. In a contingent proposition, the predicate may apply to the subject, but is not necessarily included in the subject. If we say, "Man is learned," learning is not actually in every man; some men are without knowledge. This is a contingent proposition.

POSSIBLE PROPOSITION—In a possible proposition, the predicate may be asserted of the subject without any contradiction being implied. Example: The mountain is gold. Although there has never been found a golden mountain, there is nothing in the notion of "gold" that would exclude it from being the predicate of "mountain." The two notes, "mountain" and "gold", do not exclude each other.

IMPOSSIBLE PROPOSITION—This includes no possibility of the subject and the predicate being joined; they are necessarily separate or set asunder. For example: A square circle. The notions "square" and "circle" are mutually separate ideas; they can never be joined.

The above are the different kinds of propositions with relation of the predicate to the subject. Every time we have a sentence, the predicate will be one of the four kinds mentioned—necessary, contingent, possible, or impossible.

II. *RELATION OF SUBJECT TO PREDICATE*—The relation of the subject with regard to the predicate may be:

1. Universal;
2. Particular;
3. Singular;
4. Indefinite.

UNIVERSAL PROPOSITION—This proposition implies the notion of universality; as, All men; The whole world; No man. Any sentence that implies entirety, that has no exception, is universal. In our ordinary parlance, if there is no adjective or adverb signifying universality, the subject is generally taken in its entire extension. The subject extends to all in a class or species; for instance, "Men must die." This is a universal proposition, because the subject is universal.

PARTICULAR PROPOSITION—Any part of the universal that has a particle determining a certain part of the class makes it become a particular proposition; as, "Some men"; "A few men." Any particle that will assert a part of a proposition is a particular modifying a noun that may be a universal.

SINGULAR PROPOSITION—A singular proposition is one that mentions one individual only; as, Peter is learned.

INDEFINITE PROPOSITION—Any proposition in which there is no real determination is indefinite; as, *They* say that some men are learned. "They" is indefinite; it implies no definite number.

The universal, particular, singular, or indefinite proposition may be negative or positive; as,

No man is a stone.—Universal
Some men are not learned.—Particular
Peter is learned.—Singular
They said that it does not rain there.—Indefinite

III. *SUBJECT WITH PREDICATE OR PREDICATE WITH SUBJECT*—A third class of propositions may be obtained by comparing the subject with the predicate or the predicate with the subject. These relations may be simple or complex. The complex may be subdivided into:

1. Hypothetical;
2. Conjunctive;
3. Disjunctive.

MUTUAL RELATIONS OF SUBJECT AND PREDICATE.

- ONE
  - Simple or Absolute
  - Complex
    - Conjunctive
    - Hypothetical
    - Disjunctive
    - Causal
- MULTIPLE
  - Real
  - Apparent
    - Reduplicative
    - Comparative
    - Exclusive
    - Exceptive

MUTUAL RELATIONS—Propositions may contain the relations between the subject and the predicate, between the predicate and the subject, and the inter-relations between the subject and the predicate.

SINGLE (ONE) PROPOSITION—A proposition is said to be one or single (has one unit), if there is one and only one proposition or division,—if there is only one judgment, no matter how many clauses there may be. The single proposition may be:

1. Simple or Absolute;
2. Complex.

SIMPLE PROPOSITION—We have a simple or absolute proposition if there is only one enunciation or unqualified predicate about an unqualified subject; as, Peter is a man.

COMPLEX PROPOSITION—We have a complex proposition when either the subject or the predicate is qualified, or the subject and the predicate are both qualified by any other word; for instance, Aristotle, the Athenian, was a great philosopher. Here you have the notion of Aristotle being a philosopher and Athenian, and also great. This complex proposition may be:

1. Conjunctive;
2. Hypothetical;
3. Disjunctive;
4. Causal.

CONJUNCTIVE PROPOSITION—A conjunctive proposition is one in which two or more subjects or predicates are united in such a way that they depend on one another. A conjunctive proposition is one in which you have many enunciations, which, in themselves on account of their dependence, express one idea; for instance, A body cannot rest and be in motion at the same time. Notice that you have here only one proposition or division between the subject and the predicate, although you have a multiplicity of propositions. The truth of the proposition is placed entirely on the conjunction. It is not a question of whether the body is at rest or in motion. The relation of the enunciation rests with the conjunction. "And" is the conjunction par excellence. In the mind's judgment, there is a oneness between these two propositions, because in the last analysis, one must be true, so that there is only one idea expressed. The notion must be true or false; there is only one affirmation or negation.

The conjunctive proposition denies that two things can exist, or hold true, at the same time; as, "A being cannot be created and independent."

HYPOTHETICAL PROPOSITION—A hypothetical proposition is one in which our ideas (subject and predicate) are united by a conditional particle; for instance, If it is day, there is light. You have the phrase, "If it is day," and the phrase "there is light." This gives us one affirmation or division between the subject and the predicate. There is unity in the proposition, and the truth of it will depend on the hypothetical particle "if." Therefore, the truth does not depend on the relation between the two sentences, but on the particle.

The hypothetical proposition does not affirm or deny the agreement of subject and predicate absolutely, but dependently on some supposition or condition, or with a possible alternative. It is distinguished from the *categorical*, which directly affirms or denies the agreement between a subject and a predicate without any condition or alternative.

DISJUNCTIVE PROPOSITION—A disjunctive proposition has the elements of unity, and it occurs where one or more predicates or subjects are disjoined in such a way that if one is placed, the other must be removed; for instance, "The baptism of John is either from God or from man." The proposition is placed in such a way that if you continue and say it is from God, you must necessarily exclude the other point. But there is no statement made as to whether it is from God or from man. Again, the truth of the proposition will depend on the disjunction—whether it is complete or not.

The disjunctive proposition connects incompatible clauses by the disjunctive particle "or"; as, "A being is either created or uncreated." The proposition is true if it leaves no alternative unmentioned.

MULTIPLE PROPOSITIONS—If you have more than one proposition, it is multiple—many-fold.

Propositions that are in themselves multiple, are those in which you have many affirmations or negations of subjects and predicates. They are two-fold: Real and apparent. Socrates reads; Aristotle does not run. Here you have two distinct enunciations—an affirmation and a negation.

REAL PROPOSITION (MULTIPLE)—A real proposition is one that implies an actual affirmation or negation.

APPARENT PROPOSITION (MULTIPLE)—An apparent proposition is one in which there is the appearance of one proposition, but in reality, there are two or more. Example: God is good; God is good and He alone is good. It contains two distinct propositions—the goodness of God and He being alone in His goodness.

Apparent multiple propositions may be:

1. Reduplicative;
2. Comparative;
3. Exclusive;
4. Exceptive.

REDUPLICATIVE PROPOSITION—A reduplicative proposition is one in which the subject, or the manner in which the subject is taken, is explicity expressed; as, Christ, *as man,* worked many miracles. Reduplication is important in philosophy.

COMPARATIVE PROPOSITION—A comparative proposition is one which determines the degree in which the predicate agrees with the subject; as, Cicero was the greatest of all Roman orators. You have here the notion that there were other Roman orators, and you have the further notion that, among these Roman orators, Cicero was the greatest.

EXCLUSIVE PROPOSITION—An exclusive proposition is one which expresses the fact that the subject is used or can be used only with a particular predicate, or this predicate can be used only with a particular subject. The word "alone" clearly expresses the relation. Example: God *alone* is good. The exclusive particle *"alone"* expresses the notion of exclusiveness. The exclusivity may also be expressed in regard to the predciate; as, The avaricious man seeks *only* riches. In the first sentence, the exclusiveness is in the subject; in the second sentence, it is in the predicate.

EXCEPTIVE PROPOSITION—An exceptive proposition is one in which some part of the relation between the subject and the predicate is excluded, or something is excluded from participation in the subject. Example: All men have inherited original sin, save Mary. Any proposition that will exclude any one individual from participation is exceptive. Here we have an exceptive proposition; we have the notion that the Blessed Virgin did not have original sin, but that the rest of mankind did.

PROPOSITION IN ITS FORMAL CONSIDERATION—That which is formal is the relation of the subject to the predicate combined with the copula, which may be either affirmative or negative.

Example of affirmative proposition: All men are mortal.

Negative proposition: No man is an angel.

The predicate is or is not in the subject, denying or affirming the predicate of the subject. If it is identical with the subject, it is *affirmative*; if denied of the subject, it is *negative.* If you think a thing is really what is it, you have a *true proposition*; if you think a thing is not what it is, or is what it is not, you have a *false proposition.*

MODAL PROPOSITION—We have spoken:

1. Of the relation of the predicate to the subject;
2. Of the relation of the subject to the predicate;
3. Of the relation of the copula to the subject and the predicate.

A fourth proposition is called the modal proposition.

The Modal proposition occurs where the predicate is affirmed or denied of the subject, and also of the manner in which it is or is not in the predicate—affirmed or denied. The modal proposition expresses the way in which the subject belongs to the predicate.

A proposition that not only states that the predicate may be in the subject or denies its existence in the subject, but also expresses a way in which the subject may be in the predicate, is called a modal proposition. It may be necessary, contingent, possible, or impossible. When we say that the predicate belongs to the subject in any of these four ways, we have a modal proposition. Modal—the manner in which the predicate is in the subject.

RULES THAT GOVERN PROPOSITIONS IN THEIR COMPREHENSION AND EXTENSION.

Rule 1. In an affirmative proposition, the predicate is affirmed according to its entire or full comprehension, but not (except in definitions) in its full extension. For instance, "Gold is a metal," means that gold has all the notes constituting a metal, but not that it is every metal.

We say, "except in definitions," for in these, the defining words which are the predicates, must have the same extension as the thing defined, expressed in the subject; e.g., "Man is a rational animal," i.e. "any rational animal."

"All men are mortal." In this, the predicate is affirmed of the subject according to its entire comprehension; i.e., whatever is included in the notion of "mortal"—mortality in its entire nature, is affirmed of all men. "Mortal" might mean the dissolution of component parts, the separation of body and soul, or whatever else might be included in the definition of "mortal," is affirmed of all men.

Extension of "mortal." It extends to all living beings—all that must die. When I say, "Man is mortal," I am limiting the extension of mortality to man only; I am not including anything else. Therefore, in an affirmative proposition, the predicate is affirmed of the subject according to its entire comprehension, but not according to its extension.

Rule 2. In a negative proposition, the reverse holds true, i.e., the predicate is taken in its full extension, but not in its full comprehension. For instance, "A diamond is not a metal," denies that the diamond is contained in the whole class of metals; but it does not deny that it has qualities in common with metals, since it is a substance, material, lustrous, etc., as well as metals.

The extension of the subject determines the quantity of a proposition; its quality depends on its form, i.e., on its being affirmed or denied.

This rule may also be given as follows: The predicate of a negative proposition is denied according to its entire extension, but not according to its entire comprehension; as, "man is not a brute." The "brute" of the negative is denied of the subject according to the entire extension of the predicate, but not according to its entire comprehension. When I say, "Man is not a brute," I do not mean to assert that there is no note of "brute" in man. There are certain notes in man that correspond to the brute, e.g., sentient, living, etc. In the above instance, I deny absolutely and entirely "brutality" on the part of man; it is denied, not according to its entire comprehension, but according to its entire extension. Consequently, the predicate of a negative proposition, whether universal or particular, is always taken distributively—according to its entire extension.

PROPERTIES OF PROPOSITIONS.

One proposition may be opposed to another; it may be equivalent to another; or it may be converted into another. Hence, this chapter will be divided into three articles.

I. *OPPOSITION—*

We consider first:

1. The notion or nature of opposition;
2. The different species of opposition;
3. The mutual relation of oppositions.

NATURE OF OPPOSITION—Opposition is the affirmation *and* negation of the same predicate about the same subject at the same time and in the same place. It is:

1. An affirmation *and* negation, not an affirmation *or* negation, because if you either affirm or deny, you have a different kind of proposition.

2. Affirmation and negation of the same predicate. Plato reads and he does not run—an affirmation and a negation, but not of the same predicate.

3. It must be an affirmation or negation about the same subject. Plato reads; Aristotle does not. This is not opposition, because the statement must be about the same subject; as, Plato reads, but does not write.

4. Taken in the same respect. In whatever way you understand the subject and the predicate in one proposition, you must take it the same way in the second proposition. For instance, the negro is black and white. Snow is black and white. I am not taking the same extension of the subject or the same meaning in the same way in both propositions. When I say, "Snow is white," I take it as it appears in the first proposition. In the second, I take it where the mills and the factories are located. The negro is black and white. If I understand "white" as having reference to his teeth, the proposition might be true; but we must have the same affirmation and negation about the same subject in the same way.

SPECIES OF OPPOSITION—Propositions that are opposite are of two kinds: Contrary and Contradictory propositions.

CONTRARY PROPOSITIONS—Contrary propositions are those, one of which not only affirms what the other denies, but also adds something, viz., its opposite. Examples: *All* men are prudent; *No* man is prudent. The denial of the affirmative "All" is the negative "No." All men—universal positive; No man—universal negative. These are the only two propositions—the universal positive *all* and the universal negative *no*—where one proposition not only affirms what the other denies, but also places its opposite. You may have only two such contrary propositions, and you arrive at that by the process of elimination. *All* men are prudent. *Some* men are not prudent. Here you have an affirmative and a negative with the same subject and the same predicate, but the opposite of "All" is not "Some." The opposite of "All" is "no one," so that we cannot call these two propositions contrary. Furthermore, "All" is a universal particle, while "some" is particular.

If I take the *particular propositions*, Some men are prudent; Some men are not prudent; these two propositions are not contrary propositions, of which one not only denies what the other affirms, but also places its opposite. Here, there is no opposition between the propositions.

If I take the two *indefinite propositions,* Men are prudent; Men are not prudent, there would not be an opposition, because men that are prudent may also be classed with those that are not prudent.

If I take two *individual propositions*, Peter is wise; Peter is not wise, these propositions are not contrary. We merely deny in one what we affirm in the other. By choosing two universals, a universal affirmative and a universal negative, we immediately have contrary propositions. This is the only way in which contrary propositions may be formed.

We could also say that *contrary propositions* are those propositions that differ in quality only—not in quantity; one must be affirmative and the other negative.

The *quantity of a proposition* is taken from the nature of the subject.

By the *quality of a proposition,* we mean whether it is affirmative or negative.

For the different kinds of propositions, there are no real contrary propositions except those that contain an affirmative and a negative—propositions that differ in quality.

LAWS GOVERNING CONTRARY PROPOSITIONS.

Rule 1. Contrary propositions cannot be both true at the same time, because one excludes the other. If *All* men are prudent, then the proposition, *No* man is prudent, cannot be true. If one is true the other must be false.

Rule 2. Contrary propositions, if they are taken in their entire sense, cannot be both true and false in what is called *materia necessaria.* If I say, *All* men are rational; *No* man is rational, this is a proposition called: in *materia necessaria*—rationality is necessarily predicated of man; it is found in the very nature of the subject itself. In this case, the propositions cannot both be false or both be true at the same time. If, however, the predicate is not necessarily included in the notion of the subject, they cannot both be true, but they may both be false. As a matter of fact, it is not true that *all* men are prudent; neither is it true that no man is prudent. Therefore, these two propositions cannot be true at the same time, because one excludes the other. If the predicate necessarily includes the subject, they cannot both be false.

Between the propositions, *All* men are prudent, and *No* man is prudent, you can find the proposition, *Some* men are prudent and the proposition, *Some* men are not prudent. As a result, there are three ways of distinguishing contrary propositions.

THREE WAYS OF DISTINGUISHING CONTRARY PROPOSITIONS.

1. A proposition that affirms or denies, while the other denies or affirms;

2. Contrary propositions are those that change only in their quality, but not in their quantity.

3. Contrary propositions are those propositions that admit a middle proposition as true. Between *All* men and *No* man, you may have *Some* men. You may deny universality in the affirmative and in the negative by saying *Some* men. If *Some* men are prudent and *Some* men are not prudent, the proposition *All* men are prudent, is false; while that containing *No* man is prudent, is likewise false.

CONTRADICTORY PROPOSITIONS — Contradictory propositions are those, one of which exactly denies that which the other affirms, but does not place its opposite.

The way to deny a proposition is to prefix the word "not." Example: All men are prudent.
Not all men are prudent.

The word "not," when placed before the subject "All men," denies the affirmative proposition. When we say "Not all," we have "some."

"Not," when placed before the predicate, makes its negative—Some men are *not* prudent. This is the contradiction of "All men are prudent." The contradictory proposition denies the affirmative proposition.

KINDS OF CONTRADICTORY PROPOSITIONS — There are two kinds of contradictory propositions:

1. Affirmative universal and particular negative.
2. Singular affirmative and singular negative. For instance: Peter is prudent—singular affirmative.
Peter is not prudent—singular negative.

The second sentence is contradictory of the first.

If I say, "Some men are prudent" and "Some men are not prudent," there is no contradiction. You must have an affirmative and a negative to form a contradiction. Furthermore, they must be in a proposition containing the same predicate of the same subject.

Elimination—We can also show by elimination how we may have two species of contradictory propositions. If I say, *All* men are prudent; *No* man is prudent, we have contrary propositions, but they are not contradictory.

If I say, *Some* men are prudent and *Some* men are not prudent, I do not have opposition, because the *"some"* in one case need not be the same *"some"* in the other case.

LAWS GOVERNING CONTRADICTORY PROPOSITIONS.

I. The universal affirmative and the particular negative of contradictory propositions may be both true and false at the same time. If it is true to say that *"All* men are prudent," then it is false to say, *"No* man is prudent." If *"All* men are prudent," is a false proposition, then "*Some* men are prudent," is also false. If "Peter is prudent," is a true proposition, then "Peter is not prudent," is false.

II. In contradictory propositions, one precisely denies what the other affirms: "All men are prudent." "*Not* all men are prudent."

III. Contradictory propositions admit of *no* middle terms. There is no intermediary between "Peter is prudent" and "Peter is *not* prudent."

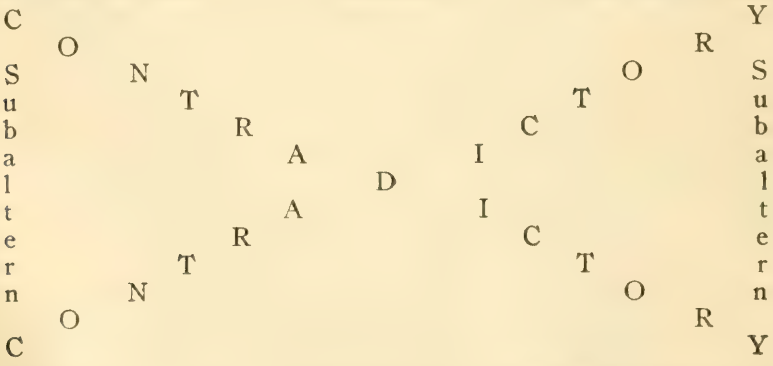
Between the contradictory propositions, "All men are prudent" and "Some men are not prudent," there can be no intermediary—no other proposition can be true, because if "All men are prudent" is not true, then "Some men cannot be prudent."

IV. In contradictory propositions, there is a change in quality and in quantity.

In *contradictory propositions* that contain *singular subjects,* we should add the following notes to the general definition: Affirmation and negation of the same predicate about the same subject, in the same respect, according to the same circumstances of time and place; for instance, "Peter is prudent." Peter could be prudent in regard to class matters, and not prudent in regard to political matters. He could be prudent here and now, but probably he was not prudent yesterday.

Where we have an individual and singular subject, the opposition must extend to the same time and place. If you take one thing as true today and another as true yesterday, then both could be true.

A) All men are wise.........(Contrary).........No man is wise (E



I) Some men are wise...(Subcontrary)...Some men are not wise (O

The Scholastics take the "A" and the "I" from the affirmative proposition (affirmo) and the "E" and "O" from the negative (nego). They represent "A" and "I" as the affirmatives—"A"—"*All* men are wise" (universal affirmative); "I"—"*Some* men are wise"—particular affirmative. "E"—"*No* man is wise" (universal negative); "O"—"*Some* men are not wise" (particular negative). The contradictories —*All* men—*Some* men, are farther away from each other than are the contraries—*All* men—*No* men. *Some* men are; *Some* men are *not*. The opposition is found in the contradictories "A" and "O", "I" and "E".

Note on opposition:—

1. Any pair of propositions which cannot be true together, even when not in form, even when they do not have the same terms as subject and predicate, may rightly be called contradictories.

2. A singular proposition will have its contradictory by changing its quality, v.g., S. is wise; S. is not wise; and as long as we remain in the same terms, such a proposition has no *contrary*.

3. When we seek the opposite of a complex proposition, whatever we add that will change its truth or falsehood will be its contradictory; and any form of denial which goes farther than what is barely sufficient, is counted as a contrary. Thus, where a disjunctive is needed as a contradictory, the denial of either one of the members is counted as contrary.

EQUIVALENCE OF PROPOSITIONS.

Equivalence is the reduction of two opposite propositions to the same meaning by means of a negative particle.

The rules for such a reduction are:—

1. Place the negation before the subject of the proposition and you will have its equivalent contradictory. The particle "not" is like the minus sign of brackets in Algebra; it changes the quantity and quality of a proposition; thus "Every man is wise," becomes "Some men are not wise."

2. To make a proposition equivalent to its contrary it suffices to place the particle "*not*" after the subject, thus "*All* men are wise" becomes. "All men are not wise," which equals "No man is wise"; the quantity of the subject remains the same, the quality of the proposition alone is changed. Now, two universal propositions differing in quality are contrary.

3. For subalternate propositions, "not" is placed before and after the subject, thus: "Not all men are not wise" equals "Some men are wise." The first "not" changes the quantity and quality, the first quality is restored by placing not after the subject, then you have two propositions differing only in quantity, or subaltern propositions.

CONVERSION OF PROPOSITIONS

Conversion is the changing of the terms of a proposition so that the subject becomes the predicate, and the predicate becomes the subject, the truth of the statement remaining unchanged.

It can take place in two ways (a third used by the Scholastics is unnatural and obsolete), viz., *simple conversion* and *conversion per acci-*

dens; the former is where the quantity of the proposition remains the same after conversion (Rule Simpliciter f*E*c*I*), i.e., only a universal negative and a particular affirmative can be changed by simple conversion. The reason is clear if we remember what is the *extension* of the *predicate* in affirmative and negative propositions. The latter takes place when the quantity of the original propositions is changed. Only the two universal propositions can be converted per accidens.

The ignorance of, or inadvertence to this doctrine is one of the most common faults in Logic and reasoning generally. If all great minds have large cerebral capacity, it does not follow that all having large cerebral capacity are great minds. The surest way to convert a proposition is, 1. to reduce it to its logical form, determining; 2. the quantity of the subject; 3. the quantity of the predicate, and 4. remembering that the only logical copula is the verb "is" or "are."

CHAPTER THREE.

ON DEFINITION.

The first question that might arise is whether Definition and Division belong to the first, second, or third part of Logic. They sometimes follow the chapter on Ideas. Probably, a more fitting place for both would be in Syllogisms, because every demonstration or syllogism is based on some part of Definition: but because Definition and Division are always expressed in a proposition, the most logical place to treat it is under the head of Judgments and Propositions.

DEFINITION—What is definition? The general definition of a definition is that it briefly explains what the thing is. It explains as briefly as possible the nature of the thing in question. Definitions that are long cannot be considered to be good definitions, and the essential thing in a definition of anything is that it be brief.

KINDS OF DEFINITION—There are two kinds of definitions—nominal and real.

NOMINAL DEFINITION—A nominal definition is a proposition briefly explaining what the thing is according to its name: finding out what the thing is from the sign given. This nominal definition may be two-fold—*etymological and historical.* In all treatises and where there is question of explaining the subject, it is expected that, before the real definition is given, the etymological and historical definitions be given.

DEFINITION.

KINDS
- NOMINAL
  - Etymological
  - Historical
- REAL
  - Intrinsic—Formal or Material Cause.
  - Extrinsic—Final or Efficient Cause.
    These four causes form what is known as the Genetic Principle.

ETYMOLOGICAL DEFINITION—The etymological definition is the explanation of the thing, taken from the word from which the thing itself is derived. For instance: "Philosophy" is derived from the Greek, and means "lover of wisdom."

HISTORICAL DEFINITION—This is also called the common definition. The historical definition is the explanation or meaning that the thing has received from common usage. It may or may not have connection with the etymological definition. For instance: the word "school." In Greek, it means "to be attentive to a book"—studious. This would be the etymological definition. Nevertheless, when we speak in philosophy of the Scholastic System or the Schoolmen, we do not mean a class room, but a certain system or method of teaching—Scholasticism.

The historical definition may be entirely different from the etymological definition. It is the sense that has been given to it in the course of ages by common usage.

REAL DEFINITION—The real definition is that which expresses exactly the intimate nature of the thing in question. This real definition may be two-fold—either intrinsic or extrinsic. The intrinsic principle or element may be either formal or material. Intrinsic—that of which a thing is made or composed. Extrinsic—the end or purpose for which the thing is intended. The extrinsic principle may be either efficient or final.

The *intrinsic elements* are those elements that enter into the thing to make it what it really is, while the *extrinsic elements* are those notes that tell for what the thing is intended, and by whom.

The real definition may be given by stating for what purpose the thing is made—the *final cause*. For example: telling what the blackboard is used for. This definition may also be given by stating its *efficient cause;* as, Man is a being created by God. If we say for what purpose man was created—to love and serve God and thereby gain heaven, we have the *final cause*. These four causes, formal, material, efficient, and final, enter into everything created. The *formal cause* (that which causes the thing to be made) and the *material cause* (that of which it is made) are intrinsic principles. The *efficient cause* (by whose action it was produced) and the *final cause* (for what purpose it is intended) are extrinsic principles.

The real definition is a metaphysical definition, particularly when the formal cause of a thing is given. The complete and real definition of anything must embrace both the intrinsic and the extrinsic principles.

RULES FOR DEFINITION—It is not necessary for any student to go to a book to find a definition; he should make his own definition of the matter in hand.

We should know what a definition must include in order to cover the matter in question. It demands, first of all, looking up the dictionary, or like work. The history of the thing may be given before we find what the thing means. You can get its formal cause—what it came from, what it is for. For instance: What is a vanity case? Of what is it made? What does it contain? What is it for?

In order to be able to make definitions, a person must know how to define the thing according to its four causes. If we have these four causes or principles, we have all that can be said about anything.

Rule 1. A definition should always be reciprocal with the thing defined. (Reciprocity—because a definition is a proposition or enunciation briefly explaining what a thing is). There must be an equality between the thing itself and the definition of it. One of the ways of testing the completeness of this definition is—put the thing defined at its opposite end of the equation, and let the definition take the place of the thing defined. Their balance will prove the correctness of the definition.

Rule 2. A definition should always be made according to the proximate genus and the last or ultimate specific difference. The proximate genus is one that has no genus below it, only species. (The proximate genus—species is its next step.) Substance or body (corpus) is a genus; animal is a genus. The ultimate difference is the specific difference. They give the nature, common with others, and proper to each.

If I say: man walks erect, this is not a specific difference, because other creatures besides man possess this quality of walking erect. If I say: man is a rational animal, I have a specific difference, because man is the only creature possessing the quality of reason.

If our definition is such that there would be any note in it that would not distinguish it from some other object in the same genus, it would not be ultimately specific. For instance, the proposition: Man is an animal. This is not specific, because many other creatures besides man are animals. But if we say: man is a rational animal, the word "rational" distinguishes man from all other animals.

Rule 3. A definition should be:

a) Clearer than the thing defined, because the very nature of the definition is to briefly explain what the thing is. It very often happens, especially in regard to technical terms, that the definition is not as clear as the thing defined. If we go further in the dictionary and try to define the first definition, matters seem to grow worse. However, the definition, in order to be of value, must be clearer than the thing defined. Those who use big words, metaphors, or put the thing to be defined in the definition violate rule 3.

b) The definition should be positive. Unless your definition of anything, no matter what it may be, has this quality, you cannot say what the thing is or is not. On account of our limited intelligence, there are things we cannot explain by the use of the positive. Take our idea of God. We see things around us; they are composite, but God is not composite. All things are finite, but God is infinite. We can only find out what God is by stating what He is not. We should always try to make a positive statement in a definition.

c) The definition must be brief. The thing defined usually consists of only one word; therefore, we should not use too many words to tell what the thing of one word is. The fewer the words, the better, provided our definition gives a clear idea of the matter in hand.

d) The definition ought to be complete, one per se, universal.

CHAPTER FOUR.

ON DIVISION.

DIVISION—Division is a proposition separating anything into its component parts. There are three elements that enter into the nature of Division:

1. The entire whole or entity is divided;
2. The parts into which this whole or entity is divided;
3. The reason why we make the division. This last division is called

the fundamentum or foundation. There must always be a reason for separating a thing into its parts. Example: Logic has three divisions: idea, judgment ,and syllogism. The reason for this division is the fundamentum or foundation, for Logic treats of mental acts which are ideas, judgment and reasoning.

We find most compositions that come into our classes are divided into paragraphs, not for any special reason, but because the writer probably counts his number of lines, and when he has reached his limit, begins a new paragraph whether it is demanded or not. He has no real division in his work and, therefore, no reason for making the separations that he does.

At times, we may define our subject very concisely, but the division is generally very difficult. This should be brought forth in any work that we do, and should at all times be the outstanding feature. We should, first, define our subject, and then give its divisions if we intend to do our work logically. This will show that we have a clear understanding of the subject under discussion.

SPECIES OR KINDS OF DIVISION.

- SPECIES
  - LOGICAL
  - REAL
    - Metaphysical
    - Physical
      - Essential
      - Integral
      - Potential

LOGICAL DIVISION—A logical division is the breaking up of a thing into the parts that enter into it logically; for instance, the division of Logic into idea, judgment, and syllogism. It is a division of notions in our mind.

REAL DIVISION—The real division is like any real entity—a division that exists independently of the mind's consideration and a thing that actually has parts. The division of ideas, taken from the notion of apprehension or extension, is a division that exists only in the mind. Where a thing has parts independent of the mind's consideration, there is a real difference, a real division, which may be metaphysical or physical.

METAPHYSICAL DIVISION—A metaphysical division is not a real division, but rather a distinction. We say, Man is a rational animal. There are really two distinct notes in the notion "man." They are not separate, yet in their reality they are two distinct entities—rationality and animality. In a metaphysical division, there can be no real separation.

PHYSICAL DIVISION—A physical division is a division of something that has corporeal existence into its component parts. These may be essential, integral, or potential.

Taking the idea "man," there are two elements that are *essential* and separable—body and soul. The elements of a chair or a table consists of a level surface and something to support it.

The *integral parts* are real physical parts that do not pertain to the essence, but go to make up the entirety; for example, man: he has a head, limbs, hands, etc.

Potential parts i.e., when a physical body is divided or broken into parts which actually are not in a thing, but exist only virtually. Example: the human soul. It is intellectual, sensitive, and vegetative. Although these three elements are in the soul, they cannot be separated from one another. One and the same soul exercises the faculties of the intellect, the senses, and vegetation. What the sensitive soul is to plants and animals, the human soul is to the human body, and a great deal more. It is the seat of thought, and the principle of sensitive and vegetative life. These powers are virtually in the soul; the soul has the virtus or power to exercise these faculties. These are known as the potential parts.

RULES GOVERNING DIVISION.

Rule 1. The different divisions or subdivisions must be inferior to the whole. No part can be superior in apprehension or extension to the entire. All the parts together must equal the entire.

Rule 2. All the members of a division should exhaust the entire. If there is any part left over or any consideration in the entirety not considered, the division is not complete. For instance: Man is divided into the white and the black races. But we know there is also a yellow race. This division does not exhaust the entire. Men are divided into two classes: foolish and wise. Neither is this true, for some men are a product of both.

Rule 3. A division, whenever possible, should be by opposites, otherwise they would not be parts mutually excluding each other. When you have the two opposites, as a rule, you exhaust the subject. Example: Man is good or bad. Good is to be done; evil is to be avoided. These are opposites. It is not possible, however, always to give opposites.

Rule 4. The division should be brief and orderly. The reason for division is to produce clearness, and not obscurity. When you divide and divide and subdivide, especially when the matter in itself is clear or small, instead of making the atmosphere clear, you make it more cloudy.

PART III.—SYLLOGISMS.

- . In Itself
  - 1. Notion
  - 2. Elements
    - Formal
    - Material
      - Remote
        - Major Term
        - Minor Term
        - Middle Term
      - Proximate
        - Promises
        - Conclusion
  - 3. Principles
    - Contradiction
    - Identity
    - Exclusion of Third
- I. Its Form
  - 1. Essential
    - Deduction
      - Notion
      - Special Principles
      - Rules of Syllogism
      - Figures of Syllogism
      - Modes of Syllogism
    - Induction
      - Various Acceptances
      - Nature of Scientific Induction
      - Kinds of Scientific Induction
      - Value of Scientific Induction
      - Auxiliary Methods
  - 2. Accidental
    - Conjunctive
    - Disjunctive
    - Conditional
    - Polysyllogism
    - Sorites
    - Dilemma
- I. Material
  - Conclusion following with certainty—Demonstration
  - Conclusion following with probability—Probable Syllogism
  - Conclusion appearing to follow—Sophism

CHAPTER ONE.

The Syllogism in Itself.

DEFINITION—Syllogism means "a summing up," or "to take the sum of." This name was first used by Plato, who considered it as a summing up of our ideas. In the same sense, it was used by Cicero and Aristotle. Syllogism as used by these men, is a reasoning or enunciation—a mental process in which having proposed two certain judgments, a third, which is actually in theses two, is deduced. An argumentation is a syllogism when, from two propositions presented, a third is deduced, this third proposition being contained in the first and the second. If the process is purely mental, it is *reasoning;* if the propositions are expressed, it is a syllogism.

A form of expression or judgment in which, from two propositions given, a certain third proposition is deduced, which third proposition is contained in the other two, is called a syllogism.

The first part of Logic treats of Ideas—predicability—second intention. The second part is Judgment, when I actually attribute this idea to something; as, John is good. The third part also treats of second intention, or the notion of consequence. I have a judgment and compare it with another judgment to see what they will amount to. The comparing of the first and second with a third, an act of second intention, for the purpose of seeing how the first compares with the second, forms what is called a syllogism. The relation between the first and the second sentence gives the consequence. Syllogism is nothing more than a second intention. Every time we say something that is more than a simple proposition, we use a syllogism. Every argument is a syllogism. There is no possible chance of having an argument unless there is hidden under whatsoever form you use, a syllogism. Example: I believe it must be cold outside, because I see people walking rapidly and rubbing their hands.

The syllogistic form is not necessarily excluded from practical life, nor is it a product of the 13th or the 14th century. At that time, however, the syllogistic system was in general use; wherever a demonstration was given, it was always by means of syllogisms.

IDEA OF THE SYLLOGISM—The idea of the syllogism is to bring forth the relation between two propositions called the *premises*, by means of a third proposition. That which is adduced is called the conclusion, and the reason for concluding from the premises given, is called the consequentia.

ELEMENTS OF THE SYLLOGISM—There are two elements to be considered—the Formal and the Material Element.

FORMAL ELEMENT—The formal element of a syllogism is that in which we consider: What it is. What is its causality—what does it do? What is the formal element of a syllogism? What makes the syllogism be what it is? Is it simply three propositions? Not necessarily. That which makes a syllogism be a syllogism is the notion of the *relation of the consequence.* It is the notion of consecution—of following—that which actually follows as a conclusion. The *conclusion* is the notion of the mind seeing the relationship between the two extremes (major and minor), the notion of consequence following from these. The *consequens* is that which follows from the other two sentences. Why is this proposition:—Justice is praiseworthy, used as a proposition? Because it is intrinsically related to the other two propositions, Justice is a virtue; Virtue is praiseworthy; therefore, Justice is praiseworthy.

The intrinsic relation is something we cannot see; it is the mind seeing the truth of the two propositions and going back on them; from this it forms the third, or conclusion. The *formal element* is the *consequentia*, and the *consequens* is the *material element.*

KNOWLEDGE BY CAUSALITY—We are now treating syllogism under the head of the formal object—the notion of the sequence from the two propositions preceding. This is often called cognitio per causam, knowledge through cause.

There are two kinds of knowledge by cause:

1. Where causality is expressed in the mind;
2. You may have a higher cognition per causam, when you delve into the reality of the cause.

I could not say in my mind that justice is praiseworthy, unless as a result of all virtue being praiseworthy.

Causality—The premises are the *material cause* of the conclusion. The *formal cause* of the conclusion, as a conclusion, is the notion of consequence. That which makes a conclusion be a conclusion is the fact that this last proposition is deduced from the two preceding.

AXIOMS WITH REGARD TO CAUSALITY—There are two axioms with regard to causality of syllogisms. They are:

1. From true propositions nothing but truth can follow;

2. Sometimes from false propositions, true propositions may follow. With regard to the first, if the premises are true—if it is true that Virtue is praiseworthy, and if it is true that Justice is a virtue, then there is nothing left but to say that Justice is praiseworthy, "Things identical with the same thing are identical with each other."

From a false proposition, sometimes truth can follow accidentally. If the premises are false, a truth can follow in this sense that in the false proposition there is a grain of truth. For instance: Nothing white is living. But snow is white. Therefore, snow is not a living thing.

Sometimes we may have a true conclusion from false premises. Because we find a true conclusion in any proposition, it does not prove that our process of thinking is correct. You may have false premises and a true conclusion. Here, there is a real connection between the conclusion and the syllogism:

No man is a living being.
Every man is a stone.
Therefore, no stone is a living being.

MATERIAL ELEMENTS—The material elements of the syllogism are the matter that enters into the definition of the syllogism. They may be proximate or remote. The syllogism is made up of two propositions called the *premises*, and the third proposition, which is deduced from the two propositions given, is called the *conclusion.*

The syllogism is not a deduction of terms, but of propositions, but the propositions themselves are composed of terms—subject and predicate.

REMOTE ELEMENTS—The remote elements are divided into the major term, the minor term and the middle term. Those things that go to make up the conclusion are called the elements.

Every virute is praiseworthy.
Justice is a virtue.
Therefore, Justice is praiseworthy.

The things that enter into this syllogism—virtue, justice, praiseworthiness, are called the terms of the syllogism. Nearer still than the terms are the propositions in which the terms are found, also known as the premises. A *term* is an expression of an idea. What is the duty of the term? The elements into which any proposition may be resolved are called the terms of that proposition. Example: Man is a rational animal. "Man" and rational animal" are the terms of the proposition. In a syllogism, the terms are so called, because they are the elements of that particular argumentation. The names given to the terms are major, minor, and middle terms. About these a certain amount of obscurity exists and certain principles must be noted in their regard.

Which are the major, the minor, and the middle term? Nine cases out of ten, the major term is in the first proposition, but this is not always so. The major and the minor terms depend, not on the arrangement of the terms themselves, but on the propositions so far as the sense is concerned. It is never a question of arrangement nor position.

The *minor term* is so called, because it has less extension than the major term. The *major term* has greater extension. Example: Virtue is a more extended notion than justice, in as much as the term virtue can extend to more objects than justice. Virtue also means sanctity, wisdom, etc. It is more universal than the notion of justice can be. Praiseworthy is still more universal than virtue. There are other things praiseworthy that are not virtues. Praiseworthy is more extended than virtue; virtue, more extended than justice. Praiseworthy—greatest extension; virtue—less extension; justice—least extension. The term that has the greatest extension is always the *major term*. That which has the least extension is called the *minor term*, and that which is between these two, is called the *middle term*. In the above mentioned syllogism, "praiseworthy" is the major term, "virtue" is the middle term, and "justice" is the minor term.

The *middle term* is so called, not because it has a central position in the syllogism, but because it is the intermediary. The reason for its existence is to compare the two terms, major and minor. Consequently, the proposition where the major term is found, is called the *major proposition*, and the proposition in which the minor term is found, is called the *minor proposition*. The reason for this is intrinsic; no matter how you change the propositions, there will be no change in the major and the minor propositions. The *major proposition* will always contain the *predicate* of the conclusion. The *minor proposition* will always contain the *subject* of the conclusion. Wherever "justice" is found, that proposition will be the minor proposition in the above example.

The notion or idea is always to compare two extremes. We said that the predicate has always greater extension than the subject, because every predicate is a universal term. We find the major and the minor propositions from the conclusion. Whatever proposition contains the predicate of the conclusion, that is the *major proposition.* The predicate in the conclusion must be more universal than the subject. The term of greatest extension in any syllogism is in the major proposition. The major term will necessarily be the predicate, because the subject of a proposition is less universal than its predicate. The predicate is *always* a universal.

PROXIMATE ELEMENTS—The proximate elements are called the premises—those things that are sent before, in order to draw your conclusion. The major and the minor terms taken together are called the premises, and the third proposition deduced from them is called the *conclusion.*. The two premises are sometimes called the *antecedent,* and the conclusion is called the *consequent.*

PRINCIPLES—The principles of syllogism are that of, a) contradiction, b) exclusion and c) identity.

In this connection, we have great confusion; there are almost as many principles as there are books.

I. The *first principle* of the syllogism is the principle of contradiction. The same thing cannot be affirmed and denied at the same time and in the same manner about the same subject. The Principle of Identity brings out this principle of Contradiction. Identical and not identical exclude each other. If you affirm a predicate about a subject, you cannot with the same predicate deny something about the same subject in the same way, for identical and not identical exclude each other. If this were true, A could equal B and *not* equal B at the same time. That which is identical with another, cannot at the same time not be identical.

II. The *second principle* is the *Principle of Identity,* which may be expressed in various ways: Things equal to the same thing are equal to each other. If two propositions are identical with a third proposition, they must be identical with each other. Two propositions, one of which is not identical with the other, cannot be identical in themselves. A equals B; B equals C; then A must equal C. A is not equal to B; B is equal to C. Then A cannot be equal to C.

Things identical with a third are identical with each other. This principle holds good for any syllogism, whether of Induction or Deduction. In order to find the relation between the two ideas, you must find a term with which both agree in order to find whether they agree between themselves, or a term with which they disagree. Example: All virtue is praiseworthy. Justice is a virtue, the relation between "justice" and "praiseworthy" is founded upon the term "virtue." Without this principle, there can be no such thing as syllogism; therefore, it is the *basis of all syllogism* —things identical with a third, art *not* identical with each other. You could not say, "All virtue is praiseworthy; justice being a virtue, is praiseworthy." This is the basic principle of the syllogism, without which the syllogism cannot exist.

III. The third principle follows directly from the first. It is called the principle of the exclusion of the third. This principle may be stated as follows: Between identity and not identity, there is no middle term, or, between being identical and not being identical, there is no middle term. If A equals B, you cannot say that A does not equal B. If it is true that A equals B, no matter what else it might equal, it certainly is not true to say that A is not equal to B. A man either walks or does not walk. He might be running or sitting; but if he walks, this excludes everything else. Between being identical and not being identical, there is no middle term. This, again, is based on the principle of identity.

CHAPTER TWO.

FORM OF THE SYLLOGISM—By the form of the syllogism, we do not mean the exterior manifestation, but that which makes it be a syllogism. This form may be subdivided into the Accidental Form and the Essential Form.

In its essential form, it may be Deduction or Induction. Deduction and Induction—according as the logical parts are deduced from a logical whole, or a logical whole is deduced from logical parts. Example: All virtue is praiseworthy. Justice is a virtue. Therefore, justice is praiseworthy. The whole—"all virtue"; "justice"—the particular virtue—the logical part deduced from a logical whole. Men and brutes are living things. Men and brutes are species of animals. Therefore, all animals are living things. "Men" and "Brutes" are parts of the whole—from the part to the whole.

DEDUCTION—The *Notion of Deduction*—Deduction is a syllogism in which, from a logical whole, we conclude to the logical parts. Example: All virtue is praiseworthy. Justice is a virtue. Therefore, Justice is praiseworthy. From the logical whole to the logical part.

SPECIAL PRINCIPLE OF DEDUCTION—The principle on which the syllogism is based is called "Dictum de Omni"—said of all. What is said of the entirety or all of a class may be said of the individual or inferior. What you affirm of substance in the comprehension of the notion is called a substance. That which is affirmed or denied about a genus can be logically affirmed or denied about any intermediary or sub genus. The predicate is affirmed about the subject. Example: This plant is a substance. All plants are substances. Everything that can be called a plant can be used as a predicate. That which is a substance can be applied according to the entire comprehension. Whatever you include in the notion of praiseworthiness can be applied to every virtue. What is said of one can be said of all.

When the predicate is denied; for instance, Snow is not a plant. Snow is not sensitive. This is denied according to the entire extension. The principle, consequently, on which the particular syllogism is based, is called Deduction—"Dictum de omni."

RULES FOR THE SYLLOGISM:

1. Middle, major, minor always terms three;
2. Than which the conclusion greater may not be;
3. Middle terms never in conclusion rest.
4. Once it must be general (universal) to stand the Logic test.
5. Two affirming judgments no negative produce.
6. Two negatives concurring are equally no use.
7. You'll find that your conclusion comes from the weaker part.
8. Particular assertions destroy logician's art.

EXPLANATION OF RULES FOR SYLLOGISMS.

1. Major, minor, and conclusion—the very nature of the syllogism is the comparison of terms in order to find the relation. In order to have a comparison of things, if you do not know their relation, you must have a third.

Syllogism—The arrangement of a proposition with another proposition, and from them is deduced the conclusion, which is virtually contained in them. (Things identical with the same thing are identical with each other.)

There may be but three terms in the syllogism—the major, the minor, and the middle. The reason for this lies in the very nature of the syllogism; namely, that it is a comparison between the said two terms. You cannot compare one thing with another unless you have a given term with which each agrees; therefore, in a syllogism, we have but three terms.

Arrangements of Terms—They are so arranged that the conclusion is contained in the premises, and the reason of the syllogism is to find the relation between the two extremes. In order that this may be done, you must have a middle term, an intermediary.

2. "Latius, etc."—greater—more extensive. For instance, if you have a universal term in a conclusion and only particular terms in the premises, you cannot have a conclusion, since there is nothing in the conclusion that is in the premises. It is the same thing as saying there are four terms, because universal and particular terms are entirely different. A equals B; B equals C; therefore, A equals C. A and C are the same kind of terms—the same in the conclusion as in the premises.

Justice is praiseworthy. Justice is to give each one his due. Since justice is a virtue, all virtue consists in giving each one his due. This is wrong. Virtue, in this instance, is a particular virtue; when you make it universal in this particular instance, you have four terms; therefore, no syllogism.

In the same manner, in the same respect that the terms are taken in the premises, they must be taken in the conclusion.

All virtue is praiseworthy;
Justice is a virtue;
Therefore, Justice is praiseworthy.

Justice is a virtue—a particular virtue; it has the same extension in the second proposition as in the third.

The predicate of an affirmative proposition is always taken disjunctively; namely, in all its comprehension. Virtue is praiseworthy. There are many things besides virtue that are praiseworthy. When I say, "Virtue is praiseworthy," I do not take praiseworthiness in all its extension. Therefore, the predicate of an affirmative proposition is taken disjunctively, or in a particular sense. In the third proposition, it is also the predicate of an affirmative proposition; consequently, it is taken in a disjunctive or particular sense. The conclusion is not more general than either the major or the minor. Justice is taken in the sense of all justice; praiseworthiness in this instance is taken in a particular sense.

In the extension of concepts, they are either universal or particular. A collective idea concept in the last analysis is taken in a particular sense. If a thing is not universal, it must be particular; if a thing is not particular, it must be universal. For instance: Virtue is not evil. The predicate of a negative proposition is taken in a universal sense. Anything that would be included in the notion "evil" must be excluded from the notion of "virtue." This is what is meant by the rule that the *conclusions must not be more universal than the premises.* Furthermore, the conclusion is not something new. From the definition of a syllogism, we find that the conclusion is really in the other two; so that it would not be comparing "justice" and "praiseworthiness" if either would change its extension. The conclusion could be *less universal;* for instance, All men are mortal; All mortal things are composite; Therefore, Peter is a composite being. It may be less universal, because universal means "all," and embraces every individual within that universality. If it is true of all, it must be true of one. "Peter" is included in the word "all." The only exception to this rule is found in *Induction,* which is a going from particulars to universals. Consequently, the conclusion must be more universal than the premises. The rule given above is for Deduction only. The conclusion must not be more extended than the premises, because the very notion of the syllogism is to find the relation between the two premises.

3. The middle term must not be in the conclusion, because it is used as the means of comparison. We do not want to use "virtue," but want to find the relation between "justice" and "praiseworthiness," to find the relation of the extremes by the use of the middle term.

All virtue is praiseworthy.
Justice is a virtue.
Therefore, justice is praiseworthy.

We want to find the relation between "praiseworthiness" and "justice." We don't want to find out anything about "virtue," but use it simply as a means to arrive at our conclusion. When you are going over a creek, you use stepping stones. Your idea is to get over to the other side, and the stones are the means of transferring you from one side to the other; but you do not pick up the stones and take them with you. When you go over a bridge, you do not carry it with you when you get to the other side. The bridge is simply a means to an end. Likewise, the middle term is but a means. It must never enter into the conclusion, because the notion of the syllogism admits the middle term as a means of comparison only.

4. The middle term must be general, or universal, at least once. Example: All virtue is praiseworthy. "All virtue" is a universal term. Justice is a virtue. "Virtue" being used as the predicate of an affirmative proposition, it is used in a particular sense—"Justice" is only one virtue, not *all* virtue. The middle term is "virtue," which is used in a universal sense. If you use it in a particular sense, as in;

> Justice is a virtue;
> A virtue is praiseworthy;
> Therefore, Justice is praiseworthy,

the particular "virtue" could also be patience. If it were, we would then have four terms. Result—no syllogism.

If we take the example: Some men are wise;
Some men are prudish;

"Some men" could mean Peter, James, and John in the first proposition; it could mean Abraham, Snodgrass, and Melchisedech in the other. In this instance, "Some men" in the first instance would certainly not be the same as "Some men" in the second. They would be particular propositions.

A certain virtue is praiseworthy. Justice is a virtue. No conclusion can be drawn from these two statements. A certain virtue could be eutropalia—the virtue of making fun, and also a moral virtue. As a result, we would have no conclusion, but would have four terms.

Some men are learned. Some men are fools. Therefore, some learned men are fools. There is no conclusion to this. The men in the first proposition are not the same as those in the second. Result: four terms—no syllogism. If A equals B, and C equals D, my answer would be nothing. Therefore, the middle term must be taken universally at least once. If you take it in a particular sense twice, you have four terms.

5. Two affirmative judgments no negative produce. Two affirmatives cannot give you a negative as a conclusion. Negation means that one predicate is not identical with the other. If virtue is praiseworthy and Justice is praiseworthy, you could not say, Justice is *not* praiseworthy.

6. If both premises are negative, no conclusion follows. Negative premises in propositions mean that the predicate is not identical with the subject. Example: No man is an angel (although in moments of supersensibility, people call each other angels). Angel is not composite. Result: No conclusion. When you affirm the predicate of the subject, you bring them together; when you say, "No," there is no comparison.

> Man is not an angel,
> An angel is not composite.

One is not the other; therefore, no conclusion. The terms are not brought together.

The fundamental proposition on which the syllogism is based is: Things identical with the same thing are identical with each other. For instance:

> Man is not an angel.
> An angel is a spiritual being.
> Therefore, man is not a spiritual being.

If things identical with the same thing are identical with each other; then it follows that things not identical with the same thing are not identical with each other. Here we have the one proposition, An angel is a spiritual being; the other proposition, Man is not an angel; the third proposition is, Man is not a spiritual being. One of these propositions is identical with the third, while the other is not so. The conclusion must then be non-identical—Man is not a spiritual being.

7. Conclusions always follow the weaker side. Propositions are either affirmative or negative, universal or particular. Of the two—affirmative and negative, the latter is always looked upon as being weaker; there is always something of strength in the affirmative. Universal and particular—all and few. The less extended part is the particular; the greater is the universal. The weaker, consequently, is the particular; so that if you have a syllogism—

All virtue is praiseworthy;
Justice is a virtue;
Therefore, justice is praiseworthy;

"All virtue' 'is universal, while "Justice" is particular. Result: the conclusion will be particular.

All men are mortal. Peter is a man. Therefore, Peter is mortal. The second proposition is the weaker.

If one proposition is affirmative and the other, negative, the conclusion will be negative. Example:

All men are composite beings;
Angels are not composite beings;
Therefore, angels are not men.

8. If both premises are particular, no conclusion will follow. Example:

Some men are wise.
Some animals are men.
Therefore, some men are animals.

Some men are foolish.
Some fools live long.
Therefore, some men live long.

The "Some men" in the first proposition would be entirely different from "Some men" in the second. Result: you have four terms, and, therefore, no comparison. Each particular is a special thing in itself. You have two particulars; then you must have four terms; you cannot have a syllogism.

CONSTRUCTING SYLLOGISMS—To prove a thesis by a syllogism, we begin by finding a proposition which really involves the truth of the thesis, and in a second proposition, we state that it does so. Thus, if I am to prove that every one must honor his father and mother, I may start with the premise:

Every one must do what God commands.

I add the minor premise:

But God commands us to honor father and mother.

Hence I legitimately draw the conclusion:

Therefore, every one must honor his father and mother.

We must examine in what ways premises may contain conclusions. If the major is a universal proposition, it may contain the conclusion in four different ways:

1. The major affirms that a predicate belongs to a whole class; the conclusion affirms that the same predicate belongs to that certain thing. The proposition being universal, the subject is distributed or taken in its widest extension; thus, "Every stone is matter" means that the predicate "matter" applies to everything that is a "stone." If, therefore, the minor states that something, say marble is a stone, the conclusion will follow that marble is "matter."

2. The major denies a predicate of a whole class; the minor affirms that a certain being is of that class; the conclusion denies that same predicate of that same being. If the major is negative; as, "A stone is not a spirit," and the minor declares that "Marble is a stone of some kind," the conclusion will be that "Marble is not a spirit."

3. A third form reasons thus: The major denies a predicate of a whole class; the minor affirms that a certain being has that predicate; the conclusion denies that said being is of said class; for, if it were of that class, it would not have that predicate. Thus, "A stone is not a spirit. But an angel is a spirit. Therefore, an angel is not a stone."

4. A fourth form of syllogism arises if the major affirms some predicate of a whole class, and the minor denies that a certain being has that predicate; the conclusion will then be that said being does not belong to said class, since all the individuals of that class have been affirmed to possess that predicate.

> "Every stone is matter;
> An angel is not matter;
> Therefore, an angel is not a stone."

In these four forms, the major is a universal proposition, and the reasoning is founded upon the wide extension of the subject. The major need not be universal in the following form, which derives its validity from the full comprehension of the predicate.

5. This form reasons thus: The major affirms that a being has a certain predicate, i.e., has all the notes comprehended in that predicate; the minor affirms that a certain note is comprehended in that predicate; the conclusion affirms that said being has said note. Thus:

> "This stone is matter;
> But all matter is extended;
> Therefore, this stone is extended."

By changing the order of the premises, this fifth form is reducible to the first.

The first and the second of these five forms are the most obvious modes of argumentation and the most constantly used. The reasoning so familiar in mathematics, A equals B, B equals C; therefore, A equals C, is an application of the *first form.* The argument, if expressed in full, would read thus: "Any two things equal to a third thing, are equal to each other; but A and C are equal to a third, B; therefore, they are equal to each other."

Similarly, from the *second form*, we have the following reasoning: Two things, one of which is equal to a third thing and the other unequal, are not equal to each other. A is equal to B; and C is not equal to B; therefore A is not equal to C.

In these two special modes of reasoning, the major propositions are usually suppressed, because they are so obvious; the arguments assume an abridged form, so constantly in use and so practically useful, that we must explain it with special care. In fact, many logicians reduce all syllogisms to these two abridged forms, which they call the *affirmative* and the *negative syllogism.*

The *affirmative syllogism,* i.e., that in which both the premises are affirmative, is based on the principle that two things equal to a third, are equal to each other; A equals B, B equals C; therefore, A equals C.

The *negative syllogism,* i.e., that in which one premise is negative, is based on the principle that two things, one of which is equal and the other unequal to a third, are unequal to each other. A equals B; B is not equal to C; therefore, A is not equal to C.

The purpose of comparing A with B, and B with C, in the premises, is to bring A and C together in the conclusion, as equal or unequal to each other. A and C are to be brought together; they are, therefore, called the extremes—*extreme terms;* B, which brings them together, is the *middle term.* The subject of the conclusion is styled the *minor extreme*; its predicate, the *major extreme.* The premise containing the major extreme is the *major premise;* that containing the minor extreme is called the *minor premise.* All the propositions together are the *matter of syllogism;* the proper connection between them is its *form* or *sequence,* a term not to be confounded with consequent or conclusion.

FIGURES OF SYLLOGISM.

By figures of syllogism we mean the arrangement of the terms in such a way that we may see how the middle term is placed—whether it is the subject or the predicate in the premises.

You may have the middle term as the subject in one and the predicate in the other; you may have it as the predicate in both or subject in both. According to the place these occupy in the syllogism as subject and predicate, you will have different figures.

NUMBER OF FIGURES—There are three figures of syllogism:

First Figure—Sub prae prima. The middle term is the subject in the major and the predicate in the minor.

All *virtue* is praiseworthy.
Justice is a *virtue.*

Therefore, justice is praiseworthy.

The middle term is "virtue," used as the subject in the first premise and as the predicate in the second premise.

Second Figure—Altera bis prae. The middle term is used twice as the predicate, in the major and in the minor proposition.

All *virtue* is praiseworthy.
But carelessness is not praiseworthy.
Therefore, carelessness is not a *virtue*.

Third Figure—Tertia bis sub—The middle term is used twice as the subject—in the major and in the minor proposition.

All *virtue* is praiseworthy.
A certain *virtue* is justice.
Therefore, justice is praiseworthy.

In all these figures, the *middle term* is the *pivotal term*. Most of our syllogisms are so arranged that we have the subject in the major and the predicate in the minor.

The way to find whether you are reasoning correctly is to apply the rules of the syllogism—see how the middle term is arranged. It is not only a question of the syllogism used in Logic, for the operations of our mind are not only ideas and judgments, but reasoning may be carried on in an extensive way—it may cover entire volumes; for instance, the "Apology" of Cardinal Newman. Every syllogism, in order to be correct, must fall under one of these three heads. We have a *fourth,* where the middle term is predicate in the major and subject in the minor.

Special Rules for the First Figure—

I. The minor premise must be affirmative.

II. The major premise must be universal.

Special Rules for the Second Figure—

I. One premise must be negative.
II. The major premise must be universal.

Special Rules for the Third Figure—

I. The minor premise must be affirmative.

II. The conclusion must be particular.

Special Rules for the Fourth Figure—(In this figure, the middle term is predicate in the major and subject in the minor. The rules for this figure are given in conditional form.)

I. If the major is affirmative, the minor must be universal. Otherwise, the middle term would not be distributed.

II. If the minor is affirmative, the conclusion must be particular. If it were universal, we should have an illicit process of the minor term.

III. If the conclusion is negative, the major must be universal.

MODES OF SYLLOGISM—This question is probably more or less speculative, but it nevertheless exists. Any work on Logic would not be complete without mentioning it.

By modes of syllogism is meant the arrangement of the premises, not with regard to subject and predicate, but with regard to the quality and quantity; namely, whether the terms are universal or particular, affirmative or negative.

There are four kinds of propositions—affirmative, negative, universal, and particular. Putting them through the three figures, we have four times four, or sixteen, times three, or forty-eight kinds of syllogisms. Adding the sixteen indirect syllogisms which may also be formed, we have sixty-four possible ways of combining propositions into syllogistic form. Of these, nineteen are correct.

EXAMPLES:—

A—All philosophers are studious.
A—But all intellectuals are philosophers.
A—Therefore, all intellectuals are studious.

If we take

A—universal affirmative
A—universal affirmative, we cannot have
E—universal negative

Because two affirmatives cannot produce a negative. Consequently, this combination is incorrect. Thus AAE is one of the sixty-four *not* correct.

A—All philosophers are studious.
A—But all intellectuals are philosophers.
I—Therefore, some intellectuals are studious.

This would be the regular way of concluding.
Another way would be:
Therefore, some studious persons are intellectual. This latter would be an indirect conclusion.

Incorrect
AEA

A—All graduates are philosophers.
E—But no farmers are graduates.
A—Therefore, all farmers are graduates.

This would not conclude in anything, because the conclusion must always follow the weaker part, E in this instance. instance.

A—All graduates are philisophers.
E—No farmers are graduates.
E—Therefore, no farmers are philosophers.

"Graduate" is the middle term; this syllogism is correct according to the first figure.

Note:—Wherever the subject of the conclusion is contained, that is the minor premise; where the predicate of the conclusion is found, that is the major premise.

A—E—I will not conclude, because wherever there is a negative premise, the conclusion must be negative.

FIRST FIGURE—

A—All graduates are philosophers.
E—But no farmers are graduates.
O—Therefore, some farmers are not philosophers.

(Particular negative.)

A—E—O will not conclude in the first figure; the middle term is subject in the major and predicate in the minor.

SECOND FIGURE—The middle term is predicate in the major and in the minor.

A—All philosophers are graduates.
E—But no farmers are graduates.
O—Therefore, some farmers are not philosophers.

THIRD FIGURE—The middle term is subject in the major and in the minor.

A—All graduates are studious.
E—But no graduates are farmers.
O—Therefore, some studious persons are not farmers.
A—I—A will not conclude, because one of the premises is particular.

A—I—E will not conclude, because the conclusion always follows the weaker part, and the weaker part here is a particular affirmative.

A—I—I will not conclude.
A—All men are mortal.
I—Peter is a man.
I—Therefore, Peter is mortal.
A—I—O will not conclude, because two affirmations cannot produce a negation.

A—O—A will not conclude, because O is a particular negative.

A—O—E will not conclude, because the conclusion always follows the weaker side, and a universal negative cannot be deduced from a particular negative.

A—O—I will not conclude; if one of the premises is negative, the conclusion cannot be an affirmative.

A—A—O will not conclude.
A—All men are mortal.
A—A certain man is a philosopher.
O—Therefore, a certain mortal is not a pihlosopher.

SUMMARY OF THE FIGURES OF THE SYLLOGISM.

AAA will conclude
AAE will not conclude
AAI will conclude
AAO will not conclude

AIA will not conclude
AIE will not conclude
AII will conclude
AIO will not conclude
AOA will not conclude
AOE will not conclude
AOI will not conclude
AOO will conclude

AEA will not conclude
AEE will conclude
AEI will not conclude
AEO will not conclude in the First Figure
AEO will conclude in the Second Figure
AEO will conclude in the Third Figure
AAA—AAI—AEE—AEO—AII—AOO will conclude.

EAA will not conclude
EAE will conclude
EAI will not conclude
EAO will conclude

EIA will not conclude
EIE will not conclude
EII will not conclude
EIO will not conclude

EEA will not conclude
EEE will not conclude
EEI will not conclude
EEO will not conclude

EOA will not conclude
EOE will not conclude
EOI will not conclude
EOO will not conclude

EAE—EAO—EIO will conclude

IAA will not conclude
IAE will not conclude
IAI will conclude
IAO will not conclude

IIA will not conclude
IIE will not conclude
III will not conclude
IIO will not conclude

IEA will not conclude
IEE will not conclude
IEI will not conclude
IEO will conclude

IOA will not conclude
IOE will not conclude
IOI will not conclude
IOO will not conclude

IAI—IEO will conclude

OAA will not conclude
OAE will not conclude
OAI will not conclude
OAO will conclude

OIA will not conclude
OIE will not conclude
OII will not conclude
OIO will not conclude

OEA will not conclude
OEE will not conclude
OEI will not conclude
OEO will not conclude

OOA will not conclude
OOE will not conclude
OOI will not conclude
OOO will not conclude

OAO is the only one that will conclude

In the above, we have twelve syllogisms that conclude directly, and with seven that conclude indirectly, we have nineteen in all. *Indirect conclusions* have the middle term as predicate in the major and subject in the minor.

Of the nineteen that conclude, the direct conclusions are not all found in the one figure. Those that are found to conclude in the first figure are AAA, EAE, EIO, EIO.

In order to make a mnemonic of these letters, the old philosophers have placed these vowels in words, with the following result:—AAA—B*a*rb*a*r*a;* EAE—C*e*l*a*r*e*nt; AII—D*a*r*ii;* EIO—F*e*r*io;* account being taken of the vowels in these words. These will conclude in the *First Figure.*

Second Figure—The middle term is predicate in the major and in the minor. Those that will conclude in this figure are: EAE, EIO, AEE, and AOO. You cannot form a conclusion in this figure, unless you have the middle term as predicate both in the major and in the minor. Example:

No man is an angel.
All spiritual beings are angels;
Therefore, no man is a spiritual being.

E—A—E.

EAE—C*e*s*a*r*e;* EIO—F*e*st*i*n*o;* AEE—C*a*m*e*str*e*s; AOO—B*a*r*o*c*o.* AOO would not conclude in the first figure.

Third Figure — EIO—F*e*r*i*s*o*n; EAO—F*e*l*a*pt*o*n; IAI—D*i*s*a*m*i*s; OAO—B*o*c*a*rd*o;* AII—D*a*t*i*s*i;* AAI—D*a*r*a*pt*i.*

Indirect—AAI—Br*a*m*a*nt*i*p; AEE—C*a*m*e*n*e*s; IAI—D*i*m*a*r*i*s; EAO—F*e*s*a*p*o;* EIO—Fr*e*s*i*s*o*n.

RULES FOR THE FIGURE OF THE SYLLOGISM—The figure of the syllogism is determined by the position of the Middle Term in the two premises:

Special Rules for the First Figure—

I. The minor premise must be affirmative.
II. The major premise must be universal.

Special Rules for the Second Figure—

I. One premise must be negative.
II. The major premise must be universal.

Special Rules for the Third Figure—

I. The minor premise must be affirmative.
II. The conclusion must be particular.

Special Rules for the Fourth Figure—(In this figure, the middle term is predicate in the major and subject in the minor. The rules for this figure are given in conditional form:

I. If the major is affirmative, the minor must be universal. Otherwise, the middle term would not be distributed.
II. If the minor is affirmative, the conclusion must be particular. If it were universal, we should have an illicit process of the minor term.
III. If the conclusion is negative, the major must be universal. The application of these rules excludes AI (Rule I), AO (Rule I), and OA (Rule III).

Mnemonic Lines—In order to form syllogisms, mediaeval writers have invented a set of memory verses, in which the vowels of the words stand for the propositions of the syllogism. The following is a modification of the lines invented in the 13th Century by William of Shyreswood, and first given wide circulation in the same century by Peter the Spaniard, afterwards Pope John XXI.

B*A*RB*A*R*A*, C*E*L*A*R*E*NT, D*A*R*II*, F*E*R*IO*QUE, prioris;
C*E*S*A*R*E*, C*A*M*E*STR*ES*, F*E*ST*I*N*O*, B*A*R*O*C*O*, secundae;
Tertia D*A*R*A*PT*I*, D*I*S*A*M*I*S, D*A*T*I*S*I*, F*E*L*A*PT*O*N,
B*O*C*A*RD*O*, F*E*R*I*S*O*N habet;
Quarta insuper addit BR*A*M*A*NT*I*P, C*A*M*E*N*E*S, *DI*M*A*R*I*S,
F*E*S*A*P*O*, FR*E*S*I*S*O*N.

The vowels underscored mean the propositions A. E. I, O, which make up the valid syllogisms in each figure. The above lines have been said to contain more meaning within a limited space than any other lines of similar length that have ever been penned.

COMPARISON OF THE FOUR FIGURES—The ***first figure*** is sometimes called the perfect figure. In it, we can prove any of the four kinds of propositions, A. E. I. O.

Second Figure—It is the only figure in which we can prove an A proposition.

Third Figure—It is the only figure in which the subject of the conclusion is subject in its premise, and the predicate of the conclusion is predicate in its premise.

Fourth Figure—To it alone can the Dictum de omni et nullo be applied directly.

Dictum de omni et nullo—Whatever is affirmed or denied of any class may be affirmed or denied of each member of that class.

The *second figure* lends itself naturally to disproof, rather than to proof. All its conclusions are negative.

The *third figure* is the most convenient for proving exceptions. All its conclusions are particular.

The *fourth figure* reverses in its premises the order which exists in the first figure. For that reason, it was not admitted by Aristotle, and is rejected by many logicians down to the present time. It was introduced by Galen, a physician, who lived in the second century of the Christian era, and it is sometimes called the Galenian Figure. Its practical importance is very slight.

Those who reject the fourth figure maintain that all its conclusions are obtainable in the first figure by a process of conversion. The moods *Bramantip*, etc., are therefore called Indirect Moods of the First Figure.

INDUCTION.

- Induction
  - I. Number of Facts
    - Complete
    - Incomplete
  - II. Nature of Facts
    - Physical
    - Moral
  - III. Experience
    - Observation
    - Experiment

DEFINITION—What is Induction? In general terms, it is opposed to Deduction. The principle of Deduction is: What is said of all can be said of the parts; therefore, the principle of Induction, its opposite, is: What is said of the parts, is said of all.

Induction is an argumentation by which we can conclude about a universal subject that which we find to be true about its inferiors—an argumentation in which we can draw a universal conclusion from particulars given—from the particular to the universal.

Induction requires careful consideration, on account of its constant application to the Physical Sciences. It follows a process the reverse of the syllogistic; for it argues, not from universals to particulars, but from particulars to universals. It may be defined as an argument in which we conclude that which is found by experience to hold true of single objects of a class, also holds good of the whole class.

All arguments in which we start from particular facts and arrive at a conclusion which is a general statement or a universal law, are inductive in their nature. Sometimes, as in geometry, we use a particular instance, for example, the triangle ABC, merely to bring the abstract qualities vividly before the mind. We argue from general qualities to other general qualities, not from the particular instance. This is not Induction at all, but Deduction. Sometimes, we take particular instances and, having enumerated them completely, we infer a general statement regarding the whole class to which they belong. Thus, we observe that cows chew the cud, and that sheep and goats also chew the cud. We next observe that cows, sheep, and goats are horned animals. From this we are warranted in summing up our observations by saying that, "All horned animals that we have observed are ruminants."

COMPLETE INDUCTION—From the number of facts narrated, we have Complete Induction and Incomplete Induction.

We have Complete Induction when we have mentioned all the facts that enter into the case; for instance, we say that we perceive the physical qualities of bodies by sight, hearing, smelling, tasting, and touch; therefore, we perceive the physical qualities of bodies by our exterior senses. We may conclude to the universal rule or fact from having observed all the inferiors or particulars. If, in a certain number of things, you have observed that from the first to the tenth, they are alike in all things, you may conclude in a universal idea—that all the others are the same.

Complete Induction examines every single object of a class, and then enunciates universally that all the class has certain properties: for instance, after exploring every zone of the earth, we may conclude, "All the zones of the earth's surface are capable of supporting human life." Complete Induction rests for its validity on this syllogism:

> Whatever is true of every individual of a class is true of the whole class.
> But a certain proposition is true of every individual of a class.
> Therefore, it may be predicated of the whole class.

You have Complete Induction when you have examined all the particular cases that may be included in a certain class.

INCOMPLETE INDUCTION—Incomplete Induction is that which concludes about a universal subject, and which experience testifies is included in a number of particular inferiors. You may experience or observe on 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 particular cases, and you then conclude that what is said of these particular cases, is true of every other case. Suppose the universality is represented by the number 150 and you have experimented on only 45; you then conclude for the 150 cases. It is an argumentation that you include universality of a fact from having observed a certain number of the particulars.

Incomplete Induction is a syllogism by which we conclude from a certain number of parts to the entire or whole. All material bodies that I have seen are heavy; they have a certain weight; therefore, *all* material bodies have weight. You have a particular fact, and from this particular fact a principle you may apply to others. You have, for instance, 50 bodies, and every one of them from the greatest to the least, has weight. You conclude, therefore, that all material things, even those you have not experimented on have weight. Therefore, all bodies have weight, then 51, 52, 53, etc., which you have not observed or experimented, have weight. You conclude to the universal from certain particulars you have observed. How can we jump from the 50 we have examined, and include, say 100 others which we have not observed? They will not deceive us. This is the *real value of Induction.*

Incomplete Induction, the ordinary process of Physical studies, does not examine every single object of a class, but a sufficient number of such objects, and under sufficiently varied circumstances, to make it certain that the property or action observed cannot be owing to any accidental cause, but must be due to the very nature of the objects and, therefore, must always accompany them, even in such cases as have not been examined. As long as any doubt remains whether, perhaps, the peculiarity constantly observed may not be owing to some accidental circumstances, Induction cannot give truly scientific certainty; but when all such doubt is excluded, the argument is conclusive. It rests upon this clear syllogistic reasoning:

> Whatever property or action flows from the very nature of objects must always accompany those objects;
> But a certain property or action is known by a sufficient variety of experiments to flow from the very nature of certain objects;
>
> Therefore, it must always accompany them.

Heavy bodies, when left unsupported, have been found in most varied circumstances, to fall to the earth and, therefore, we judge without fear of error that this tendency must be due to their very nature, and we formulate the natural law:

Heavy bodies, when unsupported, fall to the earth.

The only danger is that scientists, in their eagerness to formulate general laws, will not always examine a sufficient variety of cases to exclude all doubt as to the real cause of the phenomenon observed. Thus, Laplace laid it down as a natural law that all the parts of the solar system revolve from west to east; while it is now known that some of the solar planets and their satellites perform motions in the opposite direction.

It is evident that no conclusion is valid, except in so far as it is contained in the premises from which it is derived. Therefore, the fact that an essertion is found to hold in ninety-nine cases is no certain proof that it will hold true in the hundredth case, since this hundredth case is not contained in the cases observed. Incomplete Induction, therefore, cannot by itself, without resting on a syllogism, furnish a scientific proof. But we have scientific proofs of many things. Hence, it is evident that Materialists and Positivists (those pretended philosophers who admit nothing but matter and sensible phenomenal) are entirely mistaken when they teach that the mind has no knowledge of any universal propositions whatever, except, so far as it has observed and generalized individual facts; that all reasoning, therefore, is only generalized; that all the elements of our knowledge are only inductive, without any universal proposition on which their certainty rests. Some of these philosophers maintain that we do not even know that a circle must be round, but only that it is always known to be so on this earth, while elswhere, it may be, for all we know, square. But the proposition, "A circle is round," is self-evident, independently of observation and induction. A system is known to be false if it leads logically to absurd consequences, as this system surely does.

KINDS OF INDUCTION—There are two kinds of Induction:

1. Induction according to the nature of the facts. This division includes Physical Induction and Moral Induction.

2. Induction according to the number of facts we have examined or observed.

Example of *Physical Induction*—Wood, under certain conditions, will ignite.

Example of *Moral Induction*—Children love their parents. This is a moral fact, and from the fact that we have seen A, C, D, and E love their parents, we may conclude that all children love their parents.

If we deduce from the facts in the world around us, we have Physical Induction.

PRINCIPLE OF CAUSALITY—By what principle can I vouch for the conclusion of my universal statement applying to the facts that I have not submitted to my experience? Various opinions have been put forth, but we can put all of them into one, and say with St. Thomas that "the fundamental reason for this generalization is the principle of Causality." "Nature always acts in the same way" is the principle that St. Thomas gives us. Unless nature is impeded, it always acts in the same way. Natural laws always produce a constant universal effect, so that if these experiments that I have made act according to certain given ways in some cases, we may conclude that it is true for all, from the fact that the same cause produces the same effect, or that nature always acts in the same way unless it is hindered. Therefore, a fundamental principle in Induction is founded on the Principle of Causality.

In Induction, we have two things to observe:

1. The observation of facts;
2. The investigation of phenomena.

The proper scope of this investigation is to find a connection or casual link—a link of causality. It is not a question of making an experiment on A and B and then setting them aside. The reason for our experiment is to find a link of connection between A and B. Unless you have found by observation and experiment the particular facts, you cannot go on to generalization. Therefore, by the application of the Principle of Causality, you arrive at the conclusion. All effects have a cause, because an effect means that which is produced by some particular thing, and anything that is produced by something else is produced by a cause.

You may have two different effects. In one case you may have water becoming vaporized and in another case you may have water becoming crystallized—two distinct diametrically opposed effects. You conclude from the Principle of Causality that they are produced from diverse causes.

If you have an effect that is necessary—an effect that cannot be otherwise than according to the laws of nature, you have a *necessary effect* and you must,, therefore, have a *necessary cause*. For instance, water freezing at a certain temperature.

CONTINGENT EFFECTS—Induction is not what some hold it to be. We have absolutely no right physically, metaphysically, critically, or in any other way, to conclude to the universality of anything from having observed only one or two cases. I have seen, however, that under certain circumstances, fire burns, and I conclude that where these circumstances exist, fire always burns.

CAUSAL OR SCIENTIFIC INDUCTION—Sometimes, the general truth is inferred from one or, at most, a few instances, the evidence consisting, not in the number of instances, but in the kind or quality of the instances. In this case, one typical instance furnishes us with the knowledge of the cause of the event, and our conclusion is a statement of a causal relation. This we may style Causal or Scientific Induction. For example, one experiment with a coin and a feather in a vacuum tube will warrant us in concluding that in vacuum all bodies fall with equal velocity. We have by our experiment eliminated the interfering friction of the air, and therefore we have produced a typical instance.

ENUMERATIVE INDUCTION AND SCIENTIFIC INDUCTION—Comparing Enumerative with Scientific Induction, we remark:

1. Enumerative Induction, even when it is complete, may be of very little scientific value. I observe, for example, that the first book on the shelf opposite me is a book on Dante; so is the second, the third, the fourth, and so on to the last. Therefore, I conclude that all the books on the shelf are Dante books. This is a convenient summing up of my observations. There is no reason, however, why it should not be regarded as a true inference, because it is a progress from one form of knowledge to another aspect. Yet, it assigns no cause, and therefore is not of much use in science. It may, nevertheless, lend to the discovery of a cause. The conclusion, "All those books are books on Dante" may lead to an inquiry concerning the owner and his tastes, and to the discovery that he is a lover of Dante.

Enumerative Induction, when it is incomplete, gives only a probability, not a certitude. This probability is greater in proportion as the enumerative nears completeness. Thus, if I were to observe that the first apple in the basket is green, and the second, and the third, I should naturally expect the fourth to be green. But this is only a very slight probability. If, however, out of a thousand apples, I discover that nine hundred and ninety-nine were green, I should be almost certain that the last one would also be green. There is not in this process a mathematically correct or accurate scale of probabilities. One new instance may upset a whole series of observations or experiments. The goat is a ruminant, the cow is a ruminant, the sheep is a ruminant, and all these animals have horns. The camel, however, although a ruminant, has no horns. This last observation makes it utterly impossible for me to conclude that all ruminants have horns.

SCIENTIFIC OR CAUSAL INDUCTION gives certitude. The reason why, having obtained a few properly tested instances, we infer a general statement is that in those few instances we have segregated or abstracted the *Cause*, and we know the world in which we live is a world in which like causes are constantly producing like effects. We believe that the course of Nature is uniform; that if fire burns here and now, it will burn tomorrow, or at the other end of the world.

CERTITUDE—There is a thesis that is important and that will sum up the entire question of Induction. It is: We can acquire certain knowledge by incomplete Induction. It is a question of physical in-completeness. We can have certitude by incomplete induction. This theseis rightly belongs to Criteriology; but, since Induction is a form of argumentation and the reverse of Deduction; since it properly belongs to Syllogisms, instead of waiting until we study Criteriology, we will treat of it here.

We said that the definition of Induction is an argumentation by which we conclude from certain particulars to the universal. Its divisions are moral and physical, complete and incomplete. Complete—when you have examined all the particular cases that can be included in a certain class. Incomplete—when you have examined only a few particulars of a class and then conclude to all—to universality. You conclude from what you have seen to all.

Before we can acquire certainty, there are certain states of mind to be considered:

1. *Doubt.* There are two sides to the question, and you cannot tell which way to decide.

2. *Opinion* is a step further. You take one side of the argument rather than the other, but there is still in your mind the fear of error; you are ready to change your opinion if proofs from the other side be forthcoming. You can have a probable opinion—one that is substantiated by argument.

3. *Certitude.* This is a firm assent of the mind to a proposition without fear of error. This certitude can be of various kinds, according as the motives of your assent to the proposition are made. *Motives* may be metaphysical, physical, or moral, according as the object is metaphysical, physical, or moral. We always give our assent for a reason, called the motive of assent. The reason we assent to such a proposition is that we examine the proposition and find that the predicate is contained in the very notion of the subject—intrinsically contained in the subject. This is the highest kind of certitude—*natural certitude.*

Metaphysical Certitude—When we examine a circle and are certain that it is round; when we say that the whole is greater than any of its parts, we have *Metaphysical Certitude.*

Physical Certitude—This motive is based on the laws of nature; and according as your motive is based on the physical laws of nature, your certitude will be of physical certitude. We say that fire burns under certain conditions. If the rain falls, it will be wet. According to the analysis of rain, we find it has the property of moisture. When we give our assent to a proposition of this kind, we have a *physical certitude.*

MORAL MOTIVE OF CERTITUDE—When the motive for our assent is judging from the ordinary way that men act, judging from the way we see and know things, the motive is called a moral motive. Example: Children love their parents. We can see, without fear of being wrong, that they love their parents.

We can, without erring, say that the whole is greater than any of its parts. If a thing is metaphysically impossible, God Himself could not change it. For instance, a circle that would not be round.

Moral laws are generally true, according to the natural way of acting. You will find children who do not love their parents, but they are the exception rather than the rule.

The certitude of which we speak here is not a metaphysical certitude, because there are things you have not seen; for instance, the particular effects of certain gases or metals cannot be metaphysically certain. It is here a question of physical certitude, the laws of Nature being constant.

We saw in Metaphysics the principles of demonstration that follow from the notion of being. One is the *Principle of Sufficient Cause.* Nothing happens without a sufficient cause. Everything that is produced has a cause in proportion; otherwise, it would not happen. But a phenomenon which, when every possible adjoining circumstance is changed or varied, which is and remains constant and uniform—such a phenomenon postulates a uniform and constant cause.

In virtue of this principle, if there is a sufficient cause for everything that takes place, a cause that has sufficient power to produce that effect; if you have an effect which, through changing circumstances, remains uniform and constant, that effect postulates a *universal cause.* Therefore, in the phenomenon of Nature, there is a constant universal cause. The conclusion is contained in the "therefore," and "there is a constant uniform cause." Take any phenomenon—the formation of dew, rain, gravity, the combination of hydrogen and oxygen. Where there are certain circumstances of temperature, pressure, etc.; where everyone of these occurs, the phenomenon remains constant; but a constant and uniform cause of a phenomenon cannot be anything extrinsic to the particular facts, the facts which produced the phenomenon; that the reason for that is because in the first minor, we said that every possible circumstance is changed; nevertheless, it has remained uniform. It cannot be extrinsic, because we have changed the things extrinsic to the phenomenon—we have changed the extrinsic items in this particular case. Therefore, it is something intrinsic.

Nothing intrinsic can have constancy and uniformity, unless it belongs to the nature of the particular facts; namely, those we have experienced on or observed. Therefore, the cause of the phenomenon belongs to the very nature of the phenomenon. But what belongs to the very nature of a thing belongs to all the individuals of that nature. Therefore, in virtue of the above, it belongs to all the individuals which I have not examined.

If nature or species is made up of individual things; for instance, the nature of rain or of gravity or any of those phenomena we have examined, the cause of the phenomenon is intrinsic. Example: uniting hydrogen and oxygen under a certain temperature and in certain proportions. Unless those particular circumstances are there, they will not unite. When these conditions are uniformly constant, the cause of the phenomenon is intrinsic to the hydrogen and the oxygen examined.

Anything that is intrinsic to a thing, that cause belongs to the very nature of the particular fact I have observed. Whatever belongs to the nature of man—I find that a particular man is a rational animal; it belongs to his nature to have a sense of humor. If I find that the particular sense belongs to the nature of Peter, I do not have to examine Paul and James to discover whether they possess the same quality. In virtue of this, the premises are certain and the conclusion is certain.

EXPERIENCE—In the syllogism proper, Deduction concludes from the general to the particular. In Induction, we conclude from that which we have found to be true by experience—from observation or experiment. From what we have found about particular facts, we draw universal conclusions.

What do we mean by experience in the above? Experience means the knowledge that we acquire by means of our senses or by our conscience—knowledge of interior and exterior facts. This experience is to be had in two ways—by observation and by experiment.

OBSERVATION—When we look into a thing as it exists in its natural state, we call this observation. Example: The astronomer observes the stars.

EXPERIMENT—Experiment is the knowledge we have by inspecting the thing in the condition to which it is reduced by our action; for instance, in chemistry. The chemist takes an element and submits it to certain conditions from which certain results are produced. The astronomer cannot touch the stars, but the chemist takes the object and manipulates it. The knowledge he gets from his action is called experiment.

Experience includes both observation and experiment.

INVESTIGATION OF FACTS—Scientific investigation presupposes the study of facts. It is only after we have investigated the facts that we can conclude inductively. Now, the investigation of facts takes place by *observation* and *experiment*, and is sometimes aided by *hypothesis* and *classification*. These processes are subsidiary to Induction in the same way as Definition and Division are subsidiary to Deductive processes.

OBSERVATION AND EXPERIMENT—Observation and experiment are the recognized means of ascertaining facts. They lead to the process of Induction. They agree in this that they are both concerned with the finding of instances. They differ, however, in one essential respect. In observation, we watch attentively the occurrence we are studying, but do not interfere with it. In Experiment, we actively interfere either to produce the phenomenon which we wish to study or to modify the circumstances or conditions in which the phenomenon occurs. The astronomer who trains his telescope on a distant star, the philologist who gathers up facts of interest to the linguist, the statician and the sociologist who examine and record facts relating to social life—all these are passive onlookers, and therefore, are observers. The chemist who mixes several ingredients and notes the result; the physicist who subjects a metal to heat, electricity, etc., in order to discover and record the effects of these agencies; the physiologist who administers drugs and applies various stimuli to the nerve centers of animals for the purpose of finding out the effects on the various organs and functions—these are active investigators—*experimenters*.

ADVANTAGES OF EXPERIMENT OVER OBSERVATION—The advantages of Experiment over Observation are well recognized:

1. By Experiment we can control the occurrence of the phenomenon we are studying; in Observation we must be content to wait until it occurs. The man who should trust to Observation could not study the phenomena of electricity except when a thunder storm occurs; the experimenter can produce all the phenomena of a thunder storm a hundred times a day.

2. By Experiment we can isolate the phenomenon we are studying; this we cannot do by means of Observation. Thus, if we wish to ascertain what elements in the atmosphere are necessary for animal life, we can, by Experiment, place an animal under the bell of an air pump, exhaust the air, introduce separately, and the other ingredients of the atmosphere and note the effect of each.

3. We can by Experiment vary the circumstances or conditions indefinitely. A chemist, for example, who has discovered a new substance, can proceed to experiment on it and ascertain its various properties by combining it with other substances, subjecting it to the action of light, heat, etc. If he trusted to observation, he should be obliged to wait until he found the new substance in those various combinations.

ADVANTAGES OF OBSERVATION—On the other hand, Observation has its uses. There are sciences, such as psychology and astronomy, in which although experiment is employed, the investigator finds that the use of Observation is absolutely indispensable. There are some important phenomena of mental activity and there are many phenomena of the astronomical world which totally elude experiment. Besides, in other departments of inquiry, in medicine, hygiene, etc., we are often ignorant of the cause of the phenomena we are studying; we cannot, therefore, produce the phenomena but must wait until it occurs, and observe it.

RULES OF OBSERVATION AND EXPERIMENT—There are rules for Observation and Experiment, which may be summed up as follows:

I. Observation and Experiment should be precise. It is often of the utmost importance to note the exact place, time, duration, etc., of the phenomenon. For this purpose, we use instruments of precision—thermometers, micrometers, chronographs, etc. Our natural means of distinguishing heat from cold, for instance, would give us very vague and unsatisfactory results; whereas, by means of a finely graded thermometer, we can distinguish very slight differences of temperature. In order to secure greater accuracy, it is advisable to take several observations, and if there is any discrepancy, to take an average of observations.

II. We should attend only to material circumstances, that is to say, to conditions which are likely to influence the effect materially. No physician nowadays, when noting the patient's symptoms, would think it necessary to observe the position of the planets, because the heavenly bodies are now recognized to have no material influence on bodily health.

At the same time, too much caution cannot be exercised in regard to apparently irrelevant circumstances. Discoveries have often been delayed for whole centuries because some circumstance which really determined the effect was overlooked, or regarded as an immaterial or irrelevant circumstance.

III. The circumstances under which the Observation and Experiment are conducted should be varied as much as possible. A medical man, when studying the effect of a certain drug, will not confine his observations to one class of persons, but will extend them to persons of all classes, conditions, constitutions, and habits of life.

IV. The phenomenon we are studying should, as far as possible, be isolated from other phenomena which may interfere with it. The action of gravitation is isolated, that is, removed from the interference of atmospheric friction, in the experiment in which a coin and a feather are made to fall through a certain space in a vacuum tube. There are, of course, circumstances which cannot entirely be eliminated, but whenever they are such as to interfere with the phenomenon we are studying, they should be reduced to the minimum.

V. We should be careful to distinguish between what we actually observe and our inference from the facts. Most people confound these two very distinct sources of knowledge. The cross-examination of witnesses in court frequently brings out the fact that the witness fails to distinguish between what happened and his impressions of what happened. In scientific matters, it is all-important to distinguish what we see and our inferences from what we see; then to keep these two apart.

LAWS OF INDUCTION.

They are:

1. Method of Agreement;
2. Method of Difference;
3. Method of Concomitant Variation.

Method of Agreement in Induction—In an experiment, find what is the element or what is the effect, and wherever that element or that effect appears, this phenomena takes place. The reason is that the phenomena which constantly accompanies a certain fact, is intimately connected with it as the effect or condition. For instance, investigate the fact of the dew falling. We have observed dew on the leaves, on the grass, on our windows, on a pitcher containing water. When that dew is present, we find that the objects are colder than the surrounding air, from which fact it is inferred or induced that dew is produced, inasmuch as the surrounding air becomes chilled by contact with colder bodies. Take a pitcher of ice water to your room in the summer time and, no sooner is it there than you will find perspiration on the outside of the glass or pitcher. What causes it? You will notice it particularly in the summer time. You will notice that in the morning there is dew on the grass; the same thing occurs in the evening, but not during the day. What is taking place? You have ice water at a temperature of about 32° and your room may be

65° to 80°. The air becomes condensed by contact with the cold. The Law of Induction then is that wherever this fact is present, the phenomena of dew take place. You have seen this occurrence only once, perhaps, but from this particular fact, you conclude the universal fact—that it will take place every time under similar circumstances. This is the *Principle of Causality.*

The Law of Absence, called the Method of Difference—From different elements or effects to which any phenomena might be attributed, we suppress now one and now the other. At that suppression, the phenomenon ceases, and when brought back, the phenomenon appears, showing that that particular phenomena is intimately connected with the element or effect. You may add various acids to gases, and a certain result will be obtained. Take the acid away and the result is gone. The phenomenon is due entirely to the presence of the acids.

The Law of Variation—If the vapor is expelled from air, or the body is made to have the same temperature as the air, what happens? Suppose you find the exact temperature of the ice water in the pitcher you have in your room. You have a means of bringing the temperature of the surrounding air to the same degree as the ice water; the dew disappears. The phenomenon that you observed in the first instance has disappeared. This is the *Method of Difference or Absence.* Take away the particular effect—the difference between the cold object and the warm surrounding air, or raise the temperature of the water, and the dew disappears. Consequently, that fact again shows clearly the cause that produced the dew. The experiment is confirmed still further by increasing the temperature of your room and decreasing the temperature of the object; for instance, by adding more ice to the water, what takes place? The dew increases in proportion. Raise the temperature of your room to 100° and put more ice into the pitcher, and the dew will increase in proportion. Lower the temperature of the room and raise the temperature of the water and the dew disappears.

These are called the *Laws of Induction,* or the means by which you can test; all go to show that there is underlying everything the Principle of Causality—that all effects have causes, and like causes produce like effects.

SYLLOGISM ACCORDING TO ITS ACCIDENTAL FORMS

- KINDS
  - Unity
    - Simple
    - Conjunctive
      - Hypothetical
      - Conjunctive
      - Disjunctive
        - Simple
        - Horned
  - Multiple
    - Sorites
    - Polysyllogism

DIVISIONS—There are two general divisions of the accidental forms:

1. Those accidental forms that may be true or not;
2. The syllogism may be marked by unity or multiplicity—one or many.

DEFINITION—By accidental forms is meant the arrangement of the terms of the premises. A syllogism marked by the accidental form *unity* is called one syllogism—major, minor, conclusion—three propositions in one syllogism. If one of the premises is missing, the simple syllogism is called an *Enthymeme.* Example: Man is a rational animal. Therefore, he has free will. One of the premises is understood. Anything that is a reasonable being has free will. Man is a reasonable being; therefore, he has free will.

MULTIPLE AND SIMPLE SYLLOGISM—The difference between the multiple and the simple syllogism is that syllogisms that are not multiple have only one conclusion, while in the multiple syllogism (sorites) every succeeding proposition is a conclusion from the proposition preceding.

A syllogism may still be one and marked by unity, where there are three simple propositions containing one syllogism. It may be one and be disjunctive or conjunctive. Example:

All men are mortal.
Peter is a man.
Therefore, Peter is mortal.

The very form of this is simple; there is only one relation from which to conclude.

The conjunctive syllogism may be *hypothetical, conjunctive,* strictly speaking, *disjunctive,* or *causal.*. The peculiarity of all these kinds of syllogisms is that the conclusion that follows from the premises *depends* entirely for its truth on the conjunction. Hypothetical, conjunctive, disjunctive, or causal—the proof of their value depends on the conjunction.

HYPOTHETICAL SYLLOGISM—This syllogism is one whose major proposition is hypothetical—conditional.

Peter, if he runs, moves.
But he runs;
Therefore, he moves.

You see at once the truth of the definition for this syllogism—that the conclusion from the premises depends entirely on the conjunction between the parts. This syllogism has value according as the conditions are related. The *"if"* determines or decides the truth of the proposition.

In this hypothetical syllogism, there can be four ways of expressing—four different view points, according as you affirm or deny the condition or the conditioned. In such a proposition, the *"if"* clause and the *"then"* clause are called the *protasis* and the *apodosis.* Logicians call the propositions that depend on the condition, the *"conditioned"*—the conditionatum—the "then" clause. You may have the first chance of the hypothetical syllogism affirmative from the condition being affirmed. The affirmation and the negation will always be in the minor premise. If you affirm in the minor—"But he runs," then the conditionatum—the "then" clause must necessarily be affirmative. If the "if" clause is affirmative, the "then" clause is also affirmative, and the conclusion is a valid conclusion. The old Latins gave this the peculiar name of "causa ponens." The second case, they called the "causa tollens"—taking away.

If the conditionatum, the "then" clause, is denied—if you deny in the minor, you must deny in the conclusion.

> If Peter runs, he moves.
> But he does not move (Then clause).
> Therefore, he does not run. (The "if" clause must be denied.)

FOUR WAYS OF EXPRESSING, according as you affirm or deny:

1. From the condition being affirmed, ("if" clause), you can affirm the "then" clause. If you affirm in the minor (the "if" clause), then the conditionatum, the "then" clause, must necessarily be affirmative.

2. If you deny in the minor (the "then" clause—the apodosis), you must deny the condition ("if" clause) in the conclusion. The proof of these syllogisms depends on the particle or conjunction.

The "if" clause is also known as the "cognitio," and the "then" clause is sometimes called the "cognitionatum."

3. Conjunctive Hypothetical. If, in the minor, you deny the condition "if" clause, you must deny the "then" clause in the conclusion.

Note, however, with regard to this third case—suppose we say, "If Snodgrass runs, he moves;

> But Snodgrass does not run;
> Therefore, Snodgrass does not move.

In this third case, if you deny the condition in the minor, in order that you may deny the "then" clause in the conclusion, it must be what is called a "conditio sine quae non"—"without which it cannot be done." If a corporeal thing thinks, it is rational;

> But it does not think;
> Therefore, it is not rational.

In order to have thought, it must have rationality.

4. If, in the minor, you affirm the "then" clause, the conclusion will affirm the "if" clause, and this concludes *only* when the "if" clause and the "then" clause are inverted—taking one for the other. Example:

> *If* a being is rational,
> *Then* that being is a man.

You could not say:

> *If* a man runs, he moves,
> affirming the condition—the "if."
> But he moves;
> Therefore, he runs.

The only time we can use the fourth case is when the "if" clause and the "then" clause are the reverse of each other.

CONJUNCTIVE SYLLOGISM—The conjunctive, properly so called, is one whose major is composed of a number of propositions united by the conjunction "and," and is strictly conjunctive; the minor is an affirmation or negation of one or more of these conjoined propositions.

Example: A body (a corporeal being) is not at the same time at rest and in motion. Major.

But it is not at rest. Minor.
Therefore, it is in motion.

The conjunctive syllogism has a conjunctive major premise; as, "No one can love God and hate his neighbor." From this premise, we can reason validly by affirming one of the incompatible predicates in the minor, and denying the other in the conclusion: "But the martyrs loved God; therefore, they did not hate their neighbor," or "But Nero hated his neighbor; therefore, he did not love God."

VALUE OF THE CONJUNCTIVE SYLLOGISM—The value of this syllogism depends on the conjunctive particle. In the conjunctive syllogism, from the affirmation of one member follows the negation of the other; but, from the negation of one does not necessarily follow the affirmation of the other, unless the members of the major are contradictory. From the affirmation of one member, a body that is now at rest, cannot be in motion; from the affirmation of rest, the idea of motion is denied. The idea of motion and that of rest mutually exclude each other, so the affirmation of one member in the minor follows the negation of the other in the conclusion. But, from the negation of one idea in the minor, you cannot necessarily deduce the affirmation of the other in the conclusion, unless the members are mutually opposed to each other; unless they exclude each other. Rest excludes the idea of motion, and vice versa.

It does not rain and be warm at the same time.
But it does not rain.
Therefore, it is warm.

The *truth* of this syllogism *depends* on the *conjunctive particle* that unites the premises, or *on* the *disjunctive particle* that separates them.

DISJUNCTIVE SYLLOGISM—A disjunctive syllogism is one whose major proposition is disjunctive; namely, composed of propositions which are separated by the words, "either—or".

The Disjunctive Syllogism has a disjunctive major premise; e.g. "Either the father or the mother or the child is the natural head of the family." It is supposed that the disjunction is complete, i.e., that no fourth alternative is possible. From this major, we may reason in three ways:

1. The minor may deny one member of the disjunction, and the conclusion affirm the other members disjunctively. Example:

"But the child is not the natural head of the family;
Therefore, either the father or the mother is such."

2. The minor may affirm one of the members, the conclusion deny the other members copulatively:

> "But the father is the natural head;
> Therefore, neither the mother nor the child is such."

3. The minor may deny all the members but one, the conclusion affirm that one:

> "But the mother and the child are not;
> Therefore, the father is."

KINDS OF DISJUNCTIVE SYLLOGISMS—This disjunctive syllogism may be *simple* or *horned.*

The *simple disjunctive* has only one conclusion, no matter how many members you have.

In the *Dilemma* or *Horned Syllogisms,* no matter which side of the disjunctive you have, you conclude truly against an adversary. A disjunctive syllogism always contains the words "either—or." A so-called conjunctive disjunctive accidental horned syllogism is also called a *dilemma.*

DILEMMA—A dilemma is a syllogism whose nature is composed of propositions united or disjoined by the words "either—or," in such a way that if, in the minor you take the first member, you will be left in the second; and if you take the second, you are up against it in the first. No matter which side you take, the argument concludes against you. St. Augustine's dilemma on the truth of the Christian religion is a good example of this. He says: "The Christian religion is either propagated with miracles or without miracles. If propagated with miracles, then it is a true religion, because this shows that it came from God. If propagated without miracles, then that is the greatest of miracles. Therefore, the Christian religion is true." That a religion could be propagated throughout the entire world in spite of persecutions, wars, and everything and everybody against it, is a miracle in itself. However, in regard to the dilemma, a person must be on his guard. In order to have a good dilemma, it must conclude in the truth.

A dilemma does not touch the essence of the truth, but touches the exterior only. In order that this horned conjunctive disjunctive unified syllogism be true, the major disjunction must be complete; because, if you leave one member out, your opponent will be able to prove your argument untrue.

To conclude from a syllogism that is a complete disjunction, you must enumerate all the possible forms in the major. If you leave one out, your opponent will be able to say it can be this other one. It is a dilemma if the major proposition contains only two members; if three, it is a trilemma, etc.

KINDS OF DILEMMA—

a. Simple Constructive:

> If he steers towards Scylla, he will be wrecked;
> If he steers toward Charybdis, he will be wrecked;
> But he must steer either towards Scylla or towards Charybdis;
> Therefore, he will be wrecked.

b. Complex Constructive:

"If the Christians have committed crimes, your refusal to grant an inquiry is irrational;
If they have not, your refusal is unjust;
But, either the Christians have committed crimes or they have not;
Therefore, your refusal is either irrational or unjust."

(From Tertullian's argument against the policy of Marcus Aurelius.)

c. Simple Destructive:

If he is to sail through the straits unharmed, he must avoid Scylla and Charybdis;
But either he will not avoid Charybdis or he will not avoid Scylla;
Therefore, he will not sail unharmed.

d. Complex Destructive:

If he were reverent, he would not speak disrespectfully of the Scriptures in earnest;
If he were wise, he would not speak disrespectfully of them in jest;
But either he speaks in earnest or in jest;
Therefore, either he is not reverent or he is not wise.

STRENGTH AND WEAKNESS OF THE DILEMMA—The dilemma is, of its nature, a very telling argument. Its strength, however, is rhetorical rather than logical. It always puts the adversary in an unpleasant position, and whether he extricates himself or not, the advantage for the time being at least is on the side of the person who has succeeded in putting him there. The mere fact that the dilemma supposes an adversary, and that its success consists in inconveniencing the adversary for the time being proves that it is mainly a rhetorical, not a logical device. From the point of view of logic, therefore, the dilemma is a weak form of argument.

RULES OF THE DILEMMA—In order that the dilemma may conclude logically, it must conform to certain requirements:

1. The enunciation of alternatives in the minor must be complete. This condition is very rarely fulfilled. Socrates, for example, argued:

If death ends all things, it is not to be feared;
If death is the beginning of a happy life with the gods and heroes in Elysium, it is not to be feared;
But either death ends all or it is the beginning of a life in Elysium;
Therefore, it is not to be feared.

Socrates omitted the third alternation—the possibility of death being the beginning of an unhappy existence, which, apart from the irrational, instinctive dread of death, is the real reason why death is sometimes feared.

2. In the major premise, care should be taken that the consequents drawn from the antecedents, and no others, really follow from the antecedents. If a consequent is drawn which does not really follow, or if a consequent which really follows is omitted, the argument is not valid. It is related of the Caliph Omar, who is said to have burned the Alexandrian Library in 640 A. D., that he met the remonstrances of the custodians of the Library with the dilemma: "If your books are in conformity with the Koran, they are superfluous; if they are not, they are pernicious. But, either they are in conformity with the Koran or they are not. Therefore, either they are superfluous or they are pernicious." The minor, of course, is hardly a complete enumeration of the alternatives in the case of books which dealt with mathematics and pure science. But, passing over that defect, we remark that the inferences drawn in the major are not conclusive. It does not follow that books which agree with the Koran are superfluous or useless. They may be very useful, and their usefulness may be due to the fact that they elucidate, explain, or illustrate the doctrines of the Koran.

3. A dilemma must be such that it cannot be rebutted. A dilemma is rebutted when the adversary can take the same alternatives, draw consequents opposed to the original consequent, and so establish a conclusion the very opposite of the original conclusion. Rebuttal shows the logical weakness of the dilemma rebutted, and at the same time not only robs it of all rhetorical force, but throws the advantage very decidedly in favor of the person who rebuts the original argument. The man who frames a dilemma that is liable to rebuttal places in the hands of his adversary a ready-made weapon that can be used with telling effect. The following are historical instances of dilemmas cleverly rebutted:

a. Protagoras, the sophist, bargained to teach Eualthus Law on condition that the fee shall be paid when the pupil won his first case. Eualthus, having finished his course, took up some other business, refusing to undertake a suit. Whereupon, Protagoras brought suit against him for the promised fee; Eualthus defended the suit. Protagoras argued: "O judges, this young man must pay me my fee; for, if he loses this suit, he must pay me by order of the court; and if he win this suit, he must pay me by the terms of our contract." To this, Eualthus replied: "O judges, I am not bound to pay this sapient master. For, if I lose this suit, I am not yet bound by the terms of the contract; and if I won the suit, I am absolved by the decision of the court." The judges, we are told, left the case undecided.

b. An Athenian mother, wishing to deter her son from entering public life, argued: "If you act justly, you will displease your fellow men; if you act unjustly, you will displease the gods. But you must act either justly or unjustly. Therefore, you will either displease men or you will displease the gods." The son, a pupil of the sophists, perhaps, answered: "If I act justly, the gods will love me; if I act unjustly, men will love me. But I must act either justly or unjustly. Therefore, if I enter public life, I shall be loved either by the gods or by my fellow men."

Practical Hint—Because of the difficulty of observing these conditions in practice, the dilemma, while theoretically a valid argument, is often more fallacious than valid. In scientific exposition and demonstration, it should be used rarely and with the greatest caution.

CAUSAL SYLLOGISM—A causal syllogism is one in which, after you have given the major, you add a proof by giving the cause. It is also an accidental form of the syllogism. In this kind of argument, you prove from one step to another.

A second kind of syllogism is *Multiple*—where there is more than one conclusion. The two principle divisions of this kind of syllogism are the *sorites* and the *polysyllogism.*

SORITES—Sorites means "a heap." It may consist of as many propositions as you care to use. It is a syllogism so arranged that the predicate in the first becomes the subject of the second, and the predicate of the second becomes the subject of the third, etc., until, in the end, the conclusion has its predicate united to the subject of the first proposition.

Example:

A person who does not keep his faith does not love God;
He who does not love God does not love his neighbor;
He who does not love his neighbor does not love his country;
Therefore, he who does not keep his faith does not love his country. (The first subject is united to the last predicate.)

There must be a positive connection between the first statement and the last.

An example of what sorites is not, would be:

He who drinks well sleeps well;
He who sleeps well does not fight;
He who does not fight loves God;
He who loves God does not sin;
Therefore, he who gets drunk does not sin.

Again:

All children of Jacob are Jews;
All Jews appreciate the value of money;
All who appreciate the value of money make good bargains;
All who make good bargains become rich;
All who become rich are able to help the poor;
All who are able to help the poor are bound to do so.

Therefore, all the children of Jacob are bound to help the poor.

There is always a certain accidental weakness or chance of weakness in a Sorites, on account of the possibility of some error creeping unobserved in the course of the series; and as no chain is stronger than its weakest link, so the value of the conclusion is vitiated if a single one of the propositions is untrue. Similarity, we must watch carefully to see that there is an exact identity throughout of the sense in which the terms are used. The following is an instance in which lurk both these sources of weakness:

All consumptive patients are ordered by their physician to eat meat on a Friday;
All who are ordered by the doctor to eat meat on a Friday are bound to do so;
All who are bound to eat meat on a Friday are bound to break the laws of the Church;
All who break the laws of the Church give grave scandal to others;
All who give grave scandal to others commit a serious sin;
Therefore, all consumptive patients commit a serious sin.

RULES FOR THE SORITES—It is not difficult to deduce from the general rules of syllogistic reasoning special rules for the Sorites. It is evident, that in the first place only one premise can be negative; for, if two premises were negative, we should somewhere in the series have a combination of two negative premises, from which no conclusion may be drawn. In the next place, it is clear that if any premise is negative, it must be the last; for, if any premise is negative, the conclusion must be negative, that is to say, the term D is distributed in the conclusion. It must, therefore, be distributed in the premise, which necessitates that premise being negative. Finally, for similar reasons, we cannot have more than one particular premise, and if any premise is particular it must be the first. The middle term must be distributed at least once. If we had two particulars, or if any premise but the first were particular, there should be one syllogism which would not distribute the middle term. The rules for the Sorites are, therefore:

I. There can be only one negative premise.
II. If any premise is negative, it must be the last.
III. There can be only one particular premise.
IV. If any premise be particular, it must be the first.

POLYSYLLOGISM—Another species of syllogism is call the polysyllogism (poly, from the Greek, meaning "many"). The polysyllogism consists of many syllogisms so arranged that the conclusion of the first syllogism becomes the major premise of the succeeding syllogism.

The only *difference* between this and the ordinary syllogism is that when you have reached the conclusion of the first syllogism, instead of repeating the conclusion, you make it the major premise of a succeeding syllogism, simply using the conclusion of the first as the major of the second syllogism.

Example:

Whatever is incorporeal is simple;
But the soul is incorporeal;
Therefore, the soul is simple.
That which is simple is immortal;
Therefore, the soul is immortal.

EPICHEIREMA—Allied to the Sorites and the Polysyllogism, as a special chain of reasoning, is the form called the Epicheirema, which is a syllogism containing, besides the two premises, the proof or part of the proof of one of the premises.

The example commonly given is:

> Whatever is spiritual is immortal, because it is incapable of corruption;
> The human soul is spiritual;
> Therefore, it is immortal.

This argument is contained in the syllogism:

> Whatever is spiritual is immortal;
> The human soul is spiritual;
> Therefore, it is immortal;

to which is added part of the proof of the major premise.

The proof of the major premise is:

> Whatever is incapable of corruption is immortal;
> The spiritual is incorruptible;
> Therefore, it is immortal.

The distinction of the Epicheirema from the Polysyllogism and the Episyllogism has very little to do with the laws of correct and valid reasoning. It is a distinction which refers more to the expression of the reasoning process than to the value of that process in itself. Consequently, it is more important for the rhetorician than the logician. So far as the logician is concerned, the only point of importance is this: It is easy to introduce an unproved or an untrue premise in a chain of reasoning, and the abbreviated form of the Enthymem, the Prosyllogism, the Episyllogism, the Sorites, and the Epicheirema lends itself to the art of deception. To test these processes, therefore, it is well to expand the argument into an explicit series in which all the premises and all the conclusions are expressed.

Montaigne argued:

> If God exists, He possesses life;
> If He has life, He has senses:
> If He has senses, He is subject to corruption.

Taking this out of the conditional form, the argument would be:

> Whatever exists, possesses life;
> God exists;
> Therefore, He possesses life.
> Whatever possesses life has senses.
> God possesses life;
> Therefore, He has senses.

We may stop here, for whatever may be said about the first general statement, "Whatever exists possesses life," which is not true, the second general statement, "Whatever possesses life has senses" is manifestly false, since there is such a thing as intellectual and spiritual life which does not imply the possession of bodily senses.

CHAPTER THREE.

MATERIAL TRUTH—In the original outline of the syllogism, we have:

1. The syllogism in itself;
2. The syllogism in its form.

We will now consider its third division—Its matter or material.

According to its material truth, we have:

1. That which follows apodictically—the conclusion following with certainty—also called Demonstration;
2. The conclusion following from the premises, not with absolute certainty, but with probability;
3. The conclusion appearing to follow from the premises without actually doing so—known as a sophism or fallacy.

By material truth, we mean whatever is or can exist, which can be the object of our knowledge, taken not in relation to the mind, but as a real thing existing outside of the mind. Inasmuch as it can be known by the intellect, it is called material truth. We are here speaking of material truth in so far as the syllogism is an instrument of knowing the truth.

The materials of a syllogism, not in the sense of the elements that go to make up the syllogism, but the question is of a formal truth; namely, the manner in which the major, the minor, and the conclusion are arranged, so that the conclusion may be drawn from the major and the minor, not so much the conclusion following from the premises, but from the certain or probable truth of premises that have the appearance of truth, but in which there is an error. When a conclusion follows with certainty, it is known as a *Demonstration.*

The conclusion can necessarily follow from the premises, and is then called *Apodictic Proof;*

Secondly, the conclusion may follow with probability, and this is called the *Dialectic Syllogism* or *Probable Syllogism.*

Thirdly, the conclusion may, to all appearance, follow from the premises, but in reality it does not. This is known as the *Sophism* or *Fallacy.*

- I. APODICTIC CONSEQUENCE
    - 1. Principles of Demonstration
        - a Priori
        - a Posteriori
    - 2. Demonstration
        - Notion
        - Manner of Procedure
            - Thesis
            - State Question
            - Bring Argument
            - Refute Adversary
        - Kinds
    - 3. Science

I. DEMONSTRATION.
II. PROBABLE CONSEQUENCE
III. CONCLUSION MAY SEEM TO FOLLOW. (Sophism)

CHAPTER ONE.

On Demonstration.

Every demonstration is a syllogism, but not every syllogism is a demonstration.

We shall consider in this point:

1. That from which Demonstration proceeds—Principles of Demonstration;
2. The Demonstration in itself;
3. That which follows from Demonstration; namely, scientia or knowledge.

PRINCIPLES OF DEMONSTRATION—What are the Principles of Demonstration? Principle, in general, is that from which anything proceeds. The source of anything is the principium. Therefore, the Principle of Demonstration or the principle in the order of knowledge is that from which, or by which we can know anything, or that which is the first in the order of knowledge.

The Principles of Demonstration (they are rather principles of entity than Demonstration, and should be considered under that head in Ontology) are the *Principle of Identity*, the *Principle of Contradiction,* the *Principle of the Exclusion of the Third,* the *Principle of Causality,* and the *Principle of Sufficient Cause.*

In general, the kinds of principles of knowledge or Principles of Demonstration may furthermore be divided into two classes:

1. Principles called per se nota;
2. A Posteriori Principles.

We have a *Priori Principles,* and principles that are not directly known, but known by experience, by other proofs, by Deduction, by Syllogisms; these are called a *Posteriori Principles*—posterior to experience, or non *per se nota.*

A PRIORI PRINCIPLES, i.e., Prior to any experience. *Per se nota* means that at the very moment that the proposition is enunciated, we see the predicate contained in the subject. Example: The whole is greater than any of its parts. The moment we see this proposition, we also see that the predicate of the proposition is included in the very notion of the subject. It is a proposition directly known. We need not go into further experiment to find the truth of such a proposition.

Not all per se nota propositions are as evident as the one cited above. There are propositions that are *per se nota* in themselves. Take the proposition: God is His own existence. In this proposition, the nature of the essence of God is the same as the existence of God. This is a per se nota proposition, because directly in itself essence belongs to God. The proposition in itself is per se—we do not see it—we have to prove it.

You may have a proposition that is per se nota with regard to us. It is per se nota, not only in itself, but with regard to ourselves.

The above are called a Priori Propositions, because they presuppose no other principle of demonstration—they are prior to our experience, and the predicate is always contained in the notion of the subject. In this matter, our doctrine corresponds in some way to that of Kant, with this difference—Kant's was all a Priori—it did not suppose the outside world, while ours does.

These principles per se nota are five in number:

1. The Principle of Identity;
2. The Principle of Contradiction;
3. The Principle of Causality;
4. The Principle of the Exclusion of the Third;
5. The Principle of Sufficient Cause.

The propositions that are per se nota with regard to themselves and to us cannot be proved, for the very notion of such a proposition means that its predicate is contained in the very notion of the subject.

An a Priori demonstration always proceeds from the cause to the effect—from the knowledge of the cause. For instance. Fire; you know what it is, what its elements are, so that you do not have to prove. A Priori arguments are anterior to any experience. Without having seen fire in action, even from a picture of it, you are able to deduce a conclusion. Suppose a person knows God as the Creator, the Uncreated Being, etc., he can deduce that everything outside of God comes from Him. If you know that the soul is simple, incorporeal, spiritual, you can prove from that knowledge, irrespective of any authority, that the soul is immortal. An a priori demonstration is one in which the conclusion or effect is deduced from the very nature of the cause. It will always proceed from the cause to the effect.

When the premises are absolutely certain and are necessitated by the very nature of things, we have Demonstration a priori and the syllogism expressing it is said to be absolutely demonstrative. Example:

> All equiangular triangles are isosceles.
> All isoceles triangles have the angles at the base equal.
> Therefore, all equiangular triangles have the angles at the base equal.

A POSTERIORI PRINCIPLES—Also called Empirical Propositions. This second kind is called a posteriori or empirical. In this proposition, the predicate is not necessarily contained in the subject, but whether it agrees with the subject or not, must be proved. For instance, suppose I say that the ultimate criterion of truth is objective evidence; or, The soul is distinct from its faculties; or, The first object of our intellect is being. When I enunciate these propositions, I do not see at a glance that the predicate is contained in the subject, and whether it is or is not dependent is determined by the way I prove it. In other words, I must bring in other principles; I must prove the proposition. These are the principles on which material truth is based, and that which follows is called Demonstration.

A posteriori demonstration—posterior to experience; namely, an argument proceeding from effect to cause. When we see an effect, we know it must have had a cause; from the effect you can argue the existence of a cause. If you know the nature of the effect, you can also learn the nature of the cause.

For instance, in the argument for the existence of God, we see moton in the world around us, and from this we get the idea or knowledge of a First Mover. According to Aristotle, most of our knowledge comes to us through the senses.

DEFINITION OF DEMONSTRATION—As taken from Aristotle, this word means "to show." Hence, Demonstration is a syllogistic form or argument in which, from premises that are certain and evident, there follows a necessary conclusion which is both true and certain.

Demonstration is a syllogism which proves the material truth and produces a conclusion deduced from certain evident premises, which conclusion must be certain.

How can we know that the premises are certain and evident? They must be proved. You must take up each premise as a separate thesis to be proved and continue syllogizing until the conclusion becomes certain and evident. For instance: I want to prove that God exists. This is a thesis—a proposition to be proved. How can we prove it and prove it apodictically? We know from experience that motion exists; therefore, there exists a First Mover, which all call God. This first argument is what we call an *Enthymeme*. We know from experience that movement exists. This is one premise that is true and evident. We know this from the testimony of our senses—not only local motion, but the motion of the earth, etc., the motion that goes on in us when we go from a state of probability to a state of certitude, etc. This is not yet a proof; for a syllogism is nothing more than a mere outline of propositions which you are going to prove. Some people think that as soon as they give a syllogism which agrees with the rules of Syllogisms, that their thesis is proved. Here is a premise that is certain and evident, but the conclusion is not certain and evident; it must be proved. Take for example: There exists a First Mover. This must be proved. Suppose we proceed in this way: Motion is a transition from potency to actuality; *potency* meaning the aptitude of anything to receive perfection; actuality is that perfection itself. When a person knows the rules of Demonstration his knowledge is said to be actual. When a person is here and wants to go to New York, he is "in potentia" in New York and actually here. *Motion* is a going from potency to actuality. If it is a question of local motion, it is a going from one place to another—from Pittsburgh to New York. Motion consists not in the starting point nor the point of arrival, but the space covered between these two points. Going from a state of ignorance to a state of knowledge—a person is ignorant of Logic, but he has an intellect and also has the aptitude to acquire knowledge. In the acquisition of this knowledge, each state is gradually passed, once the motion is begun. Motion is always a mixture of potentia and aptitude. The motion consists in the going over from ignorance to the actual possession of knowledge. The rose tree that is only a root today will be in actual bloom in June. This present state is one of potentiality. In general terms, potency is the aptitude of anything to receive perfection; actuality is the state of that perfection itself. A being in potency can reduce itself to actuality; therefore, we must arrive at a Prime Mover. This conclusion, and the process leading to it, is the proof of the proposition. But of this elsewhere.

DIFFERENCE BETWEEN SYLLOGISM AND DEMONSTRATION—You can take any two propositions and deduce a conclusion from them, whether the propositions in themselves are true or false. Example:

All the apostles were martyred.
But St. John was an apostle.
Therefore, St. John was martyred.

With regard to *form*, this syllogism is correct. In order to have a demonstration, the premises must be certain. *Demonstration* is a syllogism, with this difference that the premises must be certain and true, and from them necessarily flows a conclusion. Not all the premises in a syllogism are true and evident. So, the difference between the syllogism and the demonstration is: Every demonstration is a syllogism, but not every syllogism is a demonstration. This is the notion of demonstration, and in connection with this notion, we have the manner of procedure. Since a demonstration is so important and the premises are certain and evident, it follows that there must be a manner of procedure in demonstration. This is a mechanical contrivance, but one that is absolutely necessary.

In a demonstration, the writing of the syllogism means nothing, except that a person has the right idea how to proceed. It means nothing until you have proved to the last point wherein the Demonstration differs from the Syllogism. Besides being a syllogism, besides containing the formal truth, it must also contain material truth. The premises themselves are certain and evident, and the conclusion following is also certain and evident. This is the idea of any thesis, and it is not complete until this is done. In any work, the first question asked is: "What are you going to do?" You have the exposition of your thesis, the historical explanation, etc. Then come the arguments—certain and evident principles. The *demonstration in itself consists* not only in the placing of the syllogism, but the syllogism in the demonstration is only an outline of how you are to proceed; and until each major and each minor is absolutely certain and evident, your conclusion is not proved. Since, in demonstration, you must make certain and evident your premises, the major premise generally is a definition. For instance, the definition of motion. That definition will be sufficient in itself, and it would not be necessary to explain the definition, because it is taking for granted that if it is the real definition, that is sufficient. The principal thing to do is to prove the minor.

MANNER OF PROCEDURE—Whenever a person attempts a demonstration, this is the method to follow:

1. Thesis;
2. Statement of question;
3. Arguments;
4. Refutation of Objections.

The thing in itself is very simple, but because of its simplicity, is also very difficult. This is not only a theoretic notion, but has a practical bearing. We are constantly trying to demonstrate something.

What you have in your thesis, you must be prepared to explain—every word contained in it. This is absolutely the first thing to be done. For example: The ultimate criterion of truth. Explain "criterion"; then the different criteria; tell what "ultimate" is; "truth" you must explain—what kind of truth; every word must be explained. You must give the entire history of the thesis—where; when, who upheld contrary opinions, etc.; their point of view, etc.; were there any other opinions, etc. Until all this is done, you have not proved your thesis.

You next bring forth your argument; in philosophy, arguments of reason; in theology, the argument of authority; in Scripture, the Fathers, etc. In philosophy, the argument of authority is the lowest proof.

When you have brought forth your argument there is only one argument to produce—your argument is drawn from the very essence of the thing itself; and that thing has only one essence), the next point is to consider the matter of refutation of the errors against it. Very often too much attention is paid to refuting the errors. It seems to me that if the error is rightly understood—understood as the propounder of the error understands it, and if the true doctrine is understood also, it is an easy matter. If a person understands the truth, he can apply it immediately to the fault. In the matter of doctrine, it is more important to know the true doctrine than to take weeks in trying to fathom the false doctrine or trying to disprove it. If you know the truth, you cannot help disproving the error.

CHAPTER TWO.

KINDS :—
1. Simple and composition
2. a Priori and a Posteriori
3. Induction and Deduction
4. Propter Quid—Quia
5. Direct and Indirect

I. *KINDS OF DEMONSTRATION*—We have already seen what Demonstration is, and the difference between Demonstration and Syllogism. We mentioned, in passing, the principles upon which Demonstration is built—the Principle of Contradiction, the Principle of Causality, the Principle of Identity, and the Principle of the Exclusion of the third. We saw the Method of Demonstration, and how to proceed in proving our point.

Another subdivision of Demonstration is Kinds of Demonstration. Not all the proofs we give of things are alike. Although all have demonstrating force, all do not prove in the same way. This will be made manifest as we proceed. You cannot always have a proof that is taken from the very notion of the subject, the predicate being included in the subject.

The first division is *Simple* and *Composite Demonstration. Simple Demonstration* is had where there is only one argument. *Composite Demonstration* is made up of various arguments.

The second division—*a Priori and a Posteriori Demonstration*, has already been explained.

We have spoken, too, of the third division of Demonstration—*Induction and Deduction.*

The fourth division of Demonstration is what in Latin is called *Propter Quid* (quid means the nature—the essence of the thing.) A demonstration taken from the very essence of a thing is a priori. The only *difference between the a priori and the propter quid demonstration* is this: the propter quid proceeds from the immediate cause, the proximate cause; the a priori proceeds from a remote cause. *A priori*—from any cause to any effect; *Propter Quid*—from a proximate cause to a proximate effect.

The *Demonstration Quia* is the *same as a posteriori* demonstration. A direct demonstration proves a thesis positively. In this kind of Demonstration we show our conclusions to be true by positive arguments. An *indirect demonstration* proves it negatively; it shows that the opposite is not true. For instance, all proofs for the essence and attributes of God are indirect proofs. We can show what God is not, and then indirectly conclude what He is. In *Indirect Demonstration* we show our conclusions to be true by showing the absurdity of every other alternative. This latter is also called *Reductio ad Absurdum.* Indirect Demonstration is always inferior to Direct; it does not lead the mind directly or straight to its mark; neither does it leave the mind fully satisfied; it rather takes a round-a-bout way.

EFFECTS OF DEMONSTRATION—What is the result when a person has demonstrated? We said that Demonstration is an argument which, from premises certain and evident, you draw a conclusion that is certain and evident. The result or effect of Demonstration is called *scientia—science or knowledge.* (For further explanation of Science, see the question on the nature of Philosophy, up supra.)

II. *METHOD IN REASONING*—Order is a proper arrangement of parts for any purpose whatever, theoretical or practical; *Method* is a suitable arrangement of parts with a view to a practical end. In reasoning, the end is the acquisition of the communication of knowledge.

All reasoning must begin with undoubted premises, which themselves need not be supported by reasoning; no science is expected to prove its first principles. Thus, geometry starts out with a number of axioms, from which the whole science is derived by logical reasoning. Such axioms are not blindly or arbitrarily taken for granted; but they are self-evident—they need no proof. Thus, too, in philosophy, the first principles are self-evident and need no proof.

As the mind must, of course, apprehend the premises before it draws conclusions from them, we say that in the logical order, i.e., in the order of thought, the premises are always prior to the conclusions. But in the ontological order, i.e., in the order of being a truth stated in the premises, may really be posterior to the truth expressed in the conclusion. Such is the case whenever we reason from an effect to its cause, say from a beautiful picture to the skill of the painter; for the effect is posterior to the cause and is dependent on the cause.

Reasoning thus from effect to cause is reasoning a posteriori, and reasoning from cause to effect is called a priori, since causes are ontologically prior to their effects.

The terms a priori and a posteriori have not exactly the same meaning when applied to reasoning as when aplied to judgments. A *judgment a priori* is one formed independently of experience, while a *reasoning a priori* is one proceeding from a cause to its effect.

While in a priori and a posteriori reasonings, we consider relations between two things, one of which is ontologically prior to the other; in *analytical and synthetical reasonings*, we consider only one thing—studying the relations between the whole being and its parts, between a substance and its qualities. If we are first acquainted with the whole being and from the study of it strive to discover its parts, we are said to *analyze* the subject; we then proceed analytically. But if we know the parts first, and put them together to find the whole, we proceed synthetically. The chemist analyzes a mineral to discover its simple ingredients; the apothecary combines simples into compounds.

CHAPTER THREE.

PROBABLE SYLLOGISM—A probable syllogism is one whose premises are not certain and evident, but one premise or both premises are only probable. It is an argument from premises, both of which, or at least one, is only probable; for instance, the fact narrated is true if the witnesses to the fact have knowledge and veracity. But the witnesses to the fact have knowledge and veracity. Therefore, the fact to which they testify is true. A person who tells us of the tomb of King Tut, he having sufficient knowledge of Egyptian history, etc., and working in the interest of truth and not that of fiction, if he has been found truthful previously, may be believed. Even then you cannot prove apodictively that what he says is actually certain and true.

Even though a person never told an untruth and you have everything in his favor but absolute certainty, there is still great probability, but not certainty. There is no way of proving that which depends on the subject or on contingent facts; consequently, the minor of this syllogism would not have the same certitude as the syllogism regarding the existence of God. An argument may be more or less probable in so far as the reasons in which the probabilities are based are more or less serious. The more flimsy the reason, the less probability; the stronger the proof, the greater the probability.

As the Demonstrative Syllogism leads to certainty, so the Probable Syllogism leads to opinion. St. Thomas' remarks that the operations of human reason have their counterpart in the processes of nature. There are some things in which nature acts as of necessity, and which invariably produce the same results. There are others in which she generally, but not always, pursues the same course. Thus, if we sow a seed in the ground, we generally see it under normal circumstances grow up to a perfect plant, but this is not always the case. The seed may never come up at all, or may never attain maturity. In the same way, our mind sometimes draws a conclusion as of necessity and without any hesitation. At other times, it draws a conclusion which is true in a majority of cases, but not necessarily true. In the former case, the mind proceeds by means of Demonstration. The Demonstrative Syllogism attains to scientific certitude, while the Probable Syllogism attains to probability.

Probability may be described as an approach to truth. *Truth* is a conformity of the mind with the object known. *Probability* is an approach to this conformity. In Probability, then, there are countless degrees, varying from the highest to the lowest, from the very nearest approach to certainty down to the greatest improbability. Just as in natural things (we again borrow from St. Thomas), nature may be stronger or weaker, and according to her degree of strength is her success in attaining to the end aimed at, so in all processes of argument that fall short of certainty, the mind approaches near to or withdraws further from the condition of certitude, according as it attains to a proposition which appears to have a larger or smaller conformity to truth. But however high the degree of probability attained, the mind cannot be said to have scientific knowledge so long as it does not pass beyond the probable, since in all probability there is a certain dread of the alternative opposite to that toward which we ourselves incline. Truth does not consist in the combination of a number of probabilities, or certainty of a number of probable opinions all tending to the same point.

Nevertheless, we must be on our guard here lest we confuse together *certitude* and *certainty*. It is true that certainty can never consist of probabilities united together, but certitude may be produced in the mind by the effect of such a union of probabilities. *Certainty* is something objective, and is concerned with the state of mind of one before whom the proposition has in its favor a large number of converging possibilities or probabilities, the effect upon the mind of any reasonable man is to produce a real kind of certitude. He is morally certain that the proposition is true, using the phrase "morally certain" in its proper and true sense, as meaning that he has no dread lest the contradictory be true, as long as the nature of man remains what it is.

An example will make my meaning clear. I see in a New Zealand paper the announcement of the death of a man whose name is that of an old university friend and companion of mine. The name is a common one, it is true, but I know that my friend emigrated, though I never heard where he went. I begin to wonder whether it is really my friend who is dead. A few days afterwards, I meet a mutual acquaintance of both of us, who tells me that he has just received a letter stating that so-and-so (mentioning my friend), died suddenly abroad. Not long after this, I pass a brother of the man reported to be dead and observe (I have no opportunity of speaking to him) that he has a mourning band round his hat, such as would be worn for a brother or a sister. Now each of these sources of information does not give anything more than probability. It is very possible that there may have been in New Zealand another man of the same name as my friend, not to mention the chance of a mistake in the newspaper. The report that reached our mutual acquaintance may be a mistaken one, and my friend's brother may be in mourning for another relative. Yet I feel certain that my friend is dead, and I think that under such circumstances any ordinary man would feel sufficiently certain to take practical action, if such action depended on the report being true. The combination of probabilities produces *certitude,* not the highest certitude, but *moral certitude.* It does not merely produce a high degree of probability.

In the same way, I suppose every one would allow that a jury ought not to declare a prisoner guilty, unless they are quite certain of his guilt. Yet, in nine cases out of ten, the evidence consists of probabilities, and that even where it is not only circumstantial but direct. A man is tried for robbery and violence. The prosecutor swears to his identity, he is found with purse and money in his possession, and he is a man with several convictions recorded against him. Under those circumstances, what jury would not convict, and rightly so? Yet the prosecutor may have made a mistake, the thief may have picked up the purse in the street, or may have had a similar purse of his own; as to his character, this affords a very feeble assumption of his guilt on this particular occasion. Yet the combination of probabilities produces, on the mind of jury and judge alike, a sufficient certitude to make them perfectly certain to pronounce him guilty without any need of deliberation.

What should we say to a juror who, after the trial was over and the man condemned, were to feel scruples as to the verdict passed, or worse still, who would starve out the other eleven on the ground that it is still possible that the prisoner is innocent, and ought to have the benefit of the doubt? We would answer him that his doubt was what is called an imprudent doubt; that it is absolutely possible that the whole matter was a mistake, but that it is not morally possible, when we take into account the credibility of ordinary witnesses, and the tendency of a man once convicted to commit some other crime, and the general reliance that can be placed on a man's identification of his own propery; so that we can have no reasonable doubt, and are morally certain of the prisoner's guilt.

To return to the Probable Syllogism. It is one in which one or other of the premises is a general probability, not a certain fact. The orator argues for the most part from Probable Syllogisms. This probable Syllogism is almost identical with the Rhetorical Syllogism, which is drawn as Aristotle tells us, from probabilities and things which are an indication of the conclusion.

The PROBABLE SYLLOGISM proceeds in two ways: By Analogy and Hypothesis.

ANALOGY—The proofs from Analogy; for instance, the proofs of the existence of the Blessed Sacrament; the proof of the Real Presence. All our knowledge is taken from Analogy. The proof of the necessity of frequent Communion is a syllogism, and the analogy is taken from the corporeal food compared with the spiritual food. A person who would eat but once a year would be a nice-looking sight. We nourish the body by three *full* meals a day. If it is necessary for the sustaining of the body that we eat daily, is the soul not also in need of food? The soul is not so robust as the body, and the nonsense of feeding the soul but once a year and feeding the body daily, produces an argument in Analogy. All the perfections we see in creatures, we transfer to God. In themselves, they are not proofs, but they bear a certain amount of probability.

Analogy by Similitude—For instance the simile of the Good Shepherd. This is an argument from the things that happen around us.

You can have an argument from *Analogy by Example*. For instance, Others have done it; why not I? The proof is only probable.

Analogy (parallel reasoning) is an argument by which we conclude that a certain line of reasoning will hold in one case because it is known to hold in a similar case. Thus, because we see that the actions of brutes are to a great extent similar to those of men, and in men they are prompted by certain feelings, we conclude, with very strong probability, that in brutes also they are prompted by similar feelings.

FALSE ANALOGY—Analogy is based on the conviction that if A resembles B in possessing the attributes a, b, c, d, and if B is found to possess the attribute e, it follows that e is also an attribute of A. Analogy is at best a weak form of argument, and when it is pushed too far, it is generally a source of error. The body politic, for instance, is compared with the individual body. The analogy holds to a certain extent; when urged beyond the proper limits, it becomes a false analogy and leads to error.

HYPOTHESIS—Another means of proof in Probable Syllogism is Hypothesis. Hypothetical Argument is an argumentation in which a probable proposition is assumed as a certain proposition, because if you assume it as true or certain, you can easily explain some other doctrine which has not yet been proved.

In order to use Hypothesis, it must be:

1. Possible;
2. Capable of explaining the fact to be explained.

There are various Hypotheses; for instance, those to explain away miracles, etc. In these cases, they assume that there are instances 1001 times more improbable than the miracles they are trying to disprove.

An Hypothesis (a supposition) is a proposition provisionally assumed as if true, because it accounts plausibly for many facts. For instance, it was formerly supposed that light consisted of particles emitted by luminous bodies; the present hypothesis explains the phenomena of light more plausibly by the vibrations or undulations of ether. When an hypothesis is so far confirmed by experience that it leaves no reasonable doubt as to its correctness, it ceases to be an hypothesis, and becomes a *thesis*.

An Hypothesis may be probable and truly scientific if:

1. It explains a considerable portion of the facts in question;
2. If it does not certainly contradict any well-established truth; for, as two contradictories cannot both be true, whatever,

by hypothetical argument, contravenes a well-established truth, is thereby known to be false. Numerous important discoveries have been made, especially in the Physical Sciences by means of ingenious hypotheses. On the other hand, science has often been much retarded by false hypotheses, which led investigations into wrong directions. To point out such false assumptions is to render most important services to the cause of progress.

CHAPTER FOUR.

SOPHISM OR FALLACY.

DEFINITION—The name "sophism" is taken from the Greek "sophisma," and comes to us all the way from Socrates. It is a philosophical syllogism, apparently true, but sinning against the rules of Syllogism, either in form or in matter. It is a syllogism that does not follow from the premises. This is the reason it is called a fallacy—it is false.

As we distinguish in every syllogism the form and matter, so the incorrectness of a fallacy may be either formal or material. When it is formal, that is, when it is in the form or shape of an argument, it is called a *paralogism*—a false syllogism. Thus, if I argue:

All comets have a fiery tail,
No peacocks are comets,
Therefore, no peacocks have a fiery tail,

the premises are true and the conclusion is true, but the argument is incorrect in form, and the conclusion does not follow from the premises.

When the incorrectness of the argument is to be found not in the form, but in the matter of the syllogism, the fallacy is a *Sophism,* and the syllogism is called a *Sophistical Syllogism.* If we take a purely mechanical view of such a syllogism, examining it by the rules given for the Syllogism, and using the terms merely as counters, we shall find no flaw in it; whereas, in the paralogism, the object will appear at once quite independently of the meaning of the premises or the force of the terms.

Material fallacies lie either in the words used or form of expression, the same words or expressions being used in a different sense in the two premises, or in one of the premises and the conclusion respectively, or in the things spoken of, points of difference being overlooked or points of agreement ignored. Where the fallacy lies in the words, it is said to be in the diction (in dictione), when it lies in the things spoken of, it is said to be outside the diction (extra dictione).

KINDS OF SOPHISMS—The two general divisions, then, are: *In dictione* and *Extra dictione.*

FALLACIES IN DICTIONE—Fallacies in dictione or, in the language, are divided into six classes:

1. *FALLACIES OF EQUIVOCATION,* when the same word is used in a different sense in different parts of the argument, which however, proceeds as if these senses were the same; as:

He who is outside the Church of Christ cannot be saved;
Christ;
All who hold any heretical doctrine are outside the Church of
Therefore, none who hold any heretical doctrine can be saved.

Where I am using Church in the major premise for the *soul* of the Church, which consists of all who are united to Jesus Christ by faith and charity, and in the minor premise for the *body* of the Church, united by one faith under the Vicar of Jesus Christ upon earth.

Again,

It is impossible to be in two places at the same time;
There is a story of St. Philip that he was in two places at the same time;
Therefore, there is a story of St. Philip that he did what was impossible.

This argument is well enough as far as it goes, but if in the conclusion I use *impossible* in the sense of what cannot possibly happen, and therefore disbelieve the story, I am liable to the charge of Equivocation, in that I have used the word *impossible* in the major premise for physically impossible, which impossibility does not exclude a miracle, and in the conclusion for *absolute impossibility*, which no miracle can set aside.

Here is another instance of this frequently occurring fallacy:

Indifference is a high degree of virtue;
He who says all religions are equally good exhibits a complete indifference;
Therefore, he who says all religions are equally good, exhibits a high degree of virtue.

Here, indifference of the will or that conformity with the will of God which implies a total absence of self, is treated as identical with the indifference of the intellect, or a suspension of judgment where there is an obligation to come to a decision.

He who calls any man on earth Father sins against Christ's command;
A child speaking to his parents calls him Father;
Therefore, a child speaking to his parents sins against Christ's command.

Here the command of Christ, "Call no man Father upon Earth," is treated as if it forbade the children to acknowledge their parents.

Equivocation is a fallacy in dictione—in the word itself, the various languages have what is called a pun. For example: Leo may be a lion or a person. Gallus may be a Frenchman or a rooster.

2. *FALLACIES OF ACCENT*—Fallacy in accenting a word occurs, not so much in the English language as in Latin and the other languages. For instance; in Latin, the word occidit means that he sets; while occidit means he kills. The accent changes the meaning.

This fallacy occurs when the transfer of the accent from one syllable to another gives the word a different meaning. Nestorius, who denied that Christ is God, denied also that Mary is the Mother of God. At a certain synod, he is said to have subscribed to a formula declaring that she is "Mother of God." Later on, however, wishing to retract this statement, he declared that he meant the accent to be on the antepenult, and that he meant merely that she is "the daughter of God." Latin authors give the following example: "Qui occidit est causa mortis; atqui sol vespere occidit. Ergo, sol est causa mortis." In English, the only transfer that can give rise to ambiguity is the transfer of emphasis or stress from one word in a sentence to another. The reader who lays undue stress on the last word of the sentence: "Thou shalt not bear false witness against thy *neighbor*," implies that the commandment does not condemn false witness against strangers.

3. *FALLACIES OF COMPOSITION*—Fallacy of composition consists in taking phrases together that should be taken separately, or taking propositions separately that should be taken together. For instance: 3 and 2 are 5; 3 and 2 are odd and even; therefore, 5 is odd and even. The fallacy consists in taking them together, instead of taking them separately. If taken separately, they are odd and even, but not taken together.

The Fallacy of Composition arises when we take collectively what is true only distributively. For instance:

> All the angles of this triangle are less than two right angles;
> A, B, and C are the angles of this triangle;
> Therefore, A plus B plus C are less than two right angles.

Fallacy of Division occurs, too, whenever we assert a thing to be true distributively because it is true collectively. For example:

> The twelve men of the jury are not likely to err;
> John Smith is one of the twelve;
> Therefore, John Smith is not likely to err.

"Fallacy of Division occurs when we take separately what we ought to take collectively. Example: A man is being tried for murder. There is a cumulus of evidence against him quite sufficient to hang half a dozen men. The principal witnesses are four in number. One of them was present at the murder and swore to the identity of the accused. Another had heard him vow vengeance. He was, moreover, apprehended with the pistol still smoking, from which the fatal shot had been fired. More than once he had attempted the life of the deceased. Suppose one of the jurors were to urge that a verdict of "Not guilty" be returned, and were to give as his reason that the prisoner ought to have the benefit of the doubt. The first witness might be mistaken in asserting the identity of the accused; the second, who testified to his threats, did not prove that they were carried out, for such vows are rarely kept; while, as to the smoking pistol, he might have fired it off by accident or not known that it was loaded. The previous unsuccessful attempts on the life of the deceased would be rather an argument for his innocence, because no one likes repeated failure. No one can deny the possibility, at least the remote possibility, of each of these explanations being true, and each of the facts alleged without corroborative evidence, would be sufficient to cause the prisoner's discharge. Yet, when taken collectively, they could leave no possible doubt in the mind of any reasonable man. He who takes them separately, one by one, dividing instead of combining, is guilty of the sophistical argument called the fallacy of Division."—Clarke.

5. *FALLACY OF FIGURE OF SPEECH*—This fallacy consists in assigning to a word which has a certain grammatical form, characteristics which belong to it in virtue, not of its form, but of its meaning. This fallacy is one that is more liable to deceive those who are not conversant with more than one or two languages. Translation and re-translation, the habit of speaking and thinking in different languages, tends to obviate it. Still it is not altogether obsolete in the present day, at all events among schoolboys. The boy who argues that tribus must be masculine because words of the fourth declension are masculine, or that the "a" in "dare" must be long because all words of the first conjugation have "a" long before "re" or "ris," falls into this fallacy. So too, does he who says that all active verbs imply action and, therefore, there must be some activity on the part of him who sleeps, since *sleep* is an active verb; else how could we sleep a sleep? A student of Logic would fall into this fallacy if he, in one of the premises, employed a word in its ordinary sense, and in the other in what we call its second intention; as:

> Animal is a genus;
> This giraffe is an animal;
> Therefore, this giraffe is a genus.

6. *AMPHIBOLOGY* is where the ambiguity lies not in a word, but in the sentence, the gramamtical construction being doubtful, or the expression used admitting of different explanations. Example:

> If there is no possible difficulty which justifies absence from Mass, the law enjoining attendance is cruel and severe;
> But today there is no possible difficulty which justifies our absence from Mass;
> Therefore, the law of the Church is cruel and severe.

Riddles and witticisms are often based on this fallacy, which is the necessary result of the imperfections of human language. There is no form of this more common than the confusion between the literal and the metaphorical meanings of language, between the straightforward sense of the words and some derived meaning which may be discerned behind them. It is very easy for any one who takes detached passages of a speech or a letter to distort their meaning. When our Lord said to His Apostles, "Salute no man by the way," such a command might by itself be accused of extreme discourtesy, until we learn from the word translated means that they were to make a rapid journey.

FALLACIES EXTRA DICTIONEM are those outside the language—those in which the fallacy lies, not in the form of expression, but in the idea of the objects about which we argue; when things which differ are regarded as the same, or the same things as different.

1. *PETITIO PRINCIPII, or BEGGING THE QUESTION*—This is a fallacy which occurs whenever we take for granted something which we should not make for granted; that is, either the conclusion to be proved or a part of it. Sometimes the sophist brazenly assumes the whole conclusion, though he may disguise it by casting it into different phraseology; when, for example, in the attempt to prove that a certain measure is "unconstitutional," he starts by affirming solemnly that "Whatever is contrary to the principles of the Constitution is unconstitutional," and that "this measure is contrary to the principles of the Constitution." The assertion made in the minor is precisely what the speaker has undertaken to prove. "The volume of a body diminishes when it is cooled, because the molecules then become closer" and "opium produces sleep, because it has a soporific effect" are examples of the same kind of fallacy.

"Begging the Question" is proving a proposition by taking that which you want to prove as the principal proof—the proof itself. You take the proposition as the foundation of your proof though it is just what you must prove.

VICIOUS CIRCLE—You keep on going back to the same thing. It reminds one of the cat trying to catch its own tail. You prove A by B, B by C, C by A, etc., and go on endlessly. Example: Why is a thing created? Because it depends on God. Why does it depend on God? Because it is created. The farthest point you reach is your starting point.

FALLACY A NON CAUSA PRO CAUSA—In this instance, that is taken for the cause which is not the cause.

This fallacy, also known as False Cause, is sometimes defined as the assigning effects either to an imaginary cause or to a real thing which is not a cause of the effect in question. When, for instance, the "Republic," sailing from New York on a Friday, was rammed in a fog off Nantucket on Saturday, many persons imagined that it was because she sailed on a Friday.

More correctly, however, the Non Causa pro Causa does not defer to "cause" in a scientific sense, but in the Latin juridical sense of "cause" or "contention." It consists in attempting to show that certain absurd conclusions follow from our adversary's case or contention, whereas they follow from entirely different premises. Let us suppose that the speaker is arguing in favor of capital punishment for murder. The sophist answers: "Your contention is absurd, because if the death penalty should be enforced as a deterrent in the case of murder, it is an equally efficacious deterrent in the case of theft; and therefore, in your contention, a man should be hanged for picking a pocket"; whereas, the speaker defended the death penalty on entirely different grounds; for example, on the ground that the punishment should be proportionate to the crime.

IGNORANTIA ELENCHI or IRRELEVANT CONCLUSION—This fallacy consists in evading the point at issue and, instead of proving the conclusion that should be proved, trying to establish some other conclusion. Thus, some opponents of classical education triumphantly ask, "To what practical use can a boy put a knowledge of Latin and Greek?"

thereby substituting for the real issue, namely the value of education, an irrelevant issue, the practical value of education.

A very common form of Irrelevant Conclusion is the *Argumentum ad Hominem.* This consists in turning aside from the discussion of the question at issue and directing attention to the personality of one's opponent, accusing him of inconsistency, or attacking or ridiculing his personal character or appearance. "No case; abuse the plaintiff's attorney," is the well-known advice given to a juvenile lawyer by an older practitioner, more learned in the art of wheedling a jury than in the science of law.

Similar to this is the *Arugmentum ad Populum,* in which the speaker or writer appeals to the prejudices and passions of his audience or his readers; the *Argumentum ad Ignorantiam,* in which the sophist counts on the ignorance of his audience and takes advantage of it to conceal the weakness of his own case or misrepresents the case of his opponent; the *Arugmentum ad Verecundiam,* in which he attempts to put his opponent to shame by urging the superior weight and dignity of authority on his side. "Who are you," he cries, "to set yourself up as an authority against such men as Huxley, Spencer, and Darwin?"

Finally, there is the *Argumentum ad Baculum,* the appeal to physical force, of which it has been said: "To knock a man down when he differs from you in opinion may prove your strength, but hardly your logic." Shouting one's phrases in stentorian tones, thumping the pulpit shaking one's fists at an imaginary opponent, and other forms of violence in manner, are akin to the fallacy of the Argumentum ad Baculum.

COMPLEXITY OF QUESTION—This fallacy was a common expedient of the Greek sophists in their effort to put an opponent to confusion. It consists in putting a question apparently single, but really multiple, and insisting on an unqualified "yes" or "no" for an answer. "Have you given up the habit of telling lies?" is an example. If you answer "yes," you imply that you have had that habit; if you answer "no," you intimate that you still tell lies. Of course, there is really no fallacious argument here. There is merely a trick on the part of the rhetorician, which one can evade by one's insisting on his right to resolve the question into the different parts of which it is composed and answering each separately.

FALLACY OF ACCIDENT—This arises whenever we confuse together the essential and the accidental characteristics or qualities of an object. The following is a well-known example: "What you bought yesterday, you ate today; you bought raw meat yesterday; Therefore, you ate raw meat today. The first premise refers to the substance, the second to an accidental state of that substance. Similarly, all argument from the abuse of a thing to the condemnation of the use of that thing is a fallacy of accident. It is fallacious to argue that "He who knowingly and willingly drinks an intoxicant is guilty of sin. But wine is an intoxicant. Therefore, he who knowingly and willingly drinks wine is guilty of sin. Wine is an intoxicant only in excess. To abstain from wine altogether is either a matter of worthy devotion to principle, a matter of good example, of personal asceticism, or in exceptional cases, a matter of avoiding the occasion of sin.

Of this fallacy, Nathanael was guilty when he asked: "Can any good thing come out of Nazareth?" The idea prevalent in England that all Americans speak with a nasal twang, and say, "I guess," or "I reckon," in every sentence, and the corresponding impression in America of our English cousin is that he is burly, insolent, and rather wanting in intelligence, are other instances among many.

With these words, I conclude this little memorandum of Logic. I have touched, though briefly, on its essential notes, and kept it within the strict limits of its formal object—placing order in our mental operations. May it help its readers in formulating clear ideas, propounding logical judgments, and reasoning without bias or error.

—Finis—

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